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GEOGRAPHY OF COMMERCE AND INDUSTRY

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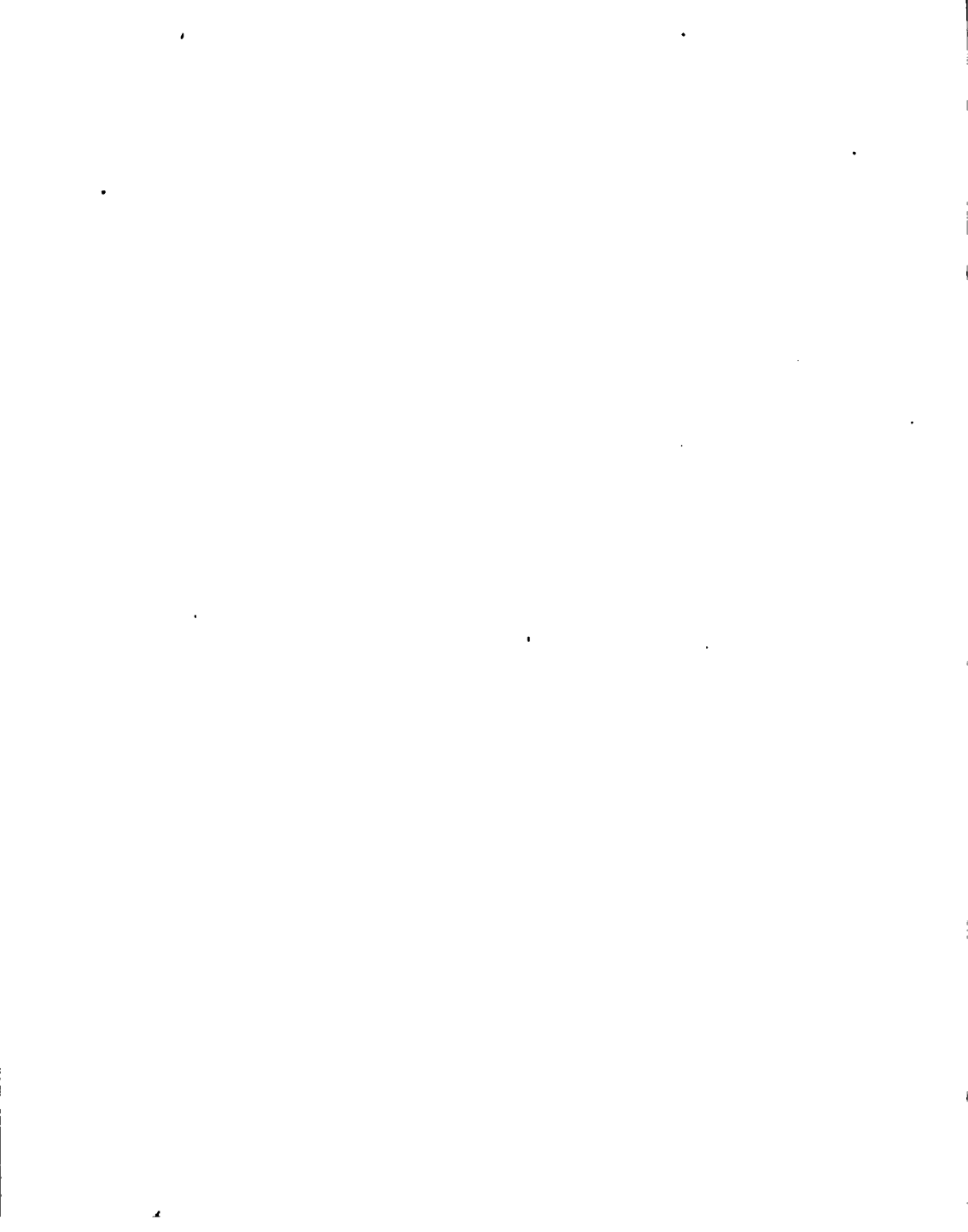


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(See page 83)

THE GEOGRAPHY OF COMMERCE AND INDUSTRY

BY

W. F. ROCHELEAU

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Pedagogy, and Superintendent of Training School, Southern
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By W. F. ROCHELEAU

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PREFACE.

Of the multitude of pupils in our public schools, only a few reach the eighth grade, and even a smaller number enter the high school, yet those who terminate their school career thus early become bread winners and home makers, and constitute a large proportion of our citizens. Many of these young people leave school almost totally ignorant of sources of supply, processes of manufacture, and cost of our most common commodities. That a knowledge of the world's great industries would give them additional power in solving the problems of life, and also make them more useful citizens, is the belief of the author of this work.

The Geography of Commerce and Industry has been prepared to meet the needs of eighth grade pupils and those who enter high school. It recognizes the dearth of reference works on many of the subjects treated, and has given the leading industries such treatment as to make each chapter a unit.

The dependence of industries upon geographical conditions, the relation of man to his environment, and the effect of commerce upon civilization are clearly shown. The industrial life of our own country is fully treated, and then the relation of the United States to other countries, and of these to each other, are shown.

The illustrations are chosen for the purpose of adding information and interest, and each map is made for the express purpose of emphasizing the feature that it represents. The relief maps were modelled by Mr. George Thorne-Thompson of the School of Education, University of Chicago, especially for this work.

Many of the questions are designed to awaken thought and lead to further study, and cannot be answered directly. By assigning them to different pupils, so that each will have one or more to investigate and report upon, they can be made to add much to the interest of the work.

The less important countries are so grouped in chapters that if desired, their study can be omitted without breaking the continuity of thought.

I am under special obligations to Mr. Frank W. Darling, head of the Department of Geography, Chicago Normal School, for critically reading the manuscript and making many valuable suggestions.

W. F. R.

Chicago, March, 1905.

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PART I.

CONDITIONS THAT DETERMINE INDUSTRIES.

CHAPTER I.

CLIMATE.

If all of the land were gathered together in one spot, it would make a country about fifty-one times the size of the United States, and if all parts were equally suited to supporting life and to supplying our wants, there would be an abundance of everything. This great country would be large enough to give to every man, woman and child in the world 1920 acres of land, a farm larger than most of the great ranches in our Western states.

Only a small part of the land, however, is capable of producing the most-useful plants and of supporting the higher forms of animal life. Of the fourteen hundred million people living upon the earth, about one-half live upon less than one-seventh of its surface. The principal causes for this unequal distribution of life, are climate and condition of the surface. Animals are compelled to live in the regions that produce their food. Only man can live away from the sources of his food supply, because he alone has devised the means for carrying what he needs to any locality in which he desires to dwell. Some animals feed upon plants, and some upon other animals. Those animals that furnish food for others, themselves feed upon plants; therefore, the animal life of any locality is determined by its plant life, and even man finds it to his advantage to dwell in those portions of the earth where his supply of food is abundant and easily obtained.

CLIMATE The most important features of climate are temperature and rainfall. As these are, so are the vegetation, animal life, and people. In general, the earth is divided climatically into the tropical, temperate, and polar regions.

Tropical Regions The tropical regions are characterized by high temperatures, and in some localities an abundance of rainfall, and in others almost an entire absence of rainfall. Where there is an abundance of rainfall we find the most luxuriant vegetation. The regions best illustrating these conditions of life are found in the valleys of the Amazon and Kongo Rivers. In the forests of the Amazon the trees grow to an enormous size, and twining and climbing plants and undergrowth form thickets so dense that it is impossible to penetrate them. Here also are myriads of insects of the most gorgeous hues and birds of brilliant plumage.

The inhabitants of this region need but little clothing, and that of the simplest sort. The only purpose of dwellings is to shelter them from the heavy rains and hot sun. Food is abundant and grows without cultivation. The climate is enervating, and there is nothing to lead man to exert himself beyond the little labor necessary to supply his daily wants. Consequently we find the inhabitants indolent and in a state bordering on savagery. They have made no progress since they were first discovered by the Spaniards nearly four hundred years ago.

In the valley of the Kongo we find conditions somewhat similar, but the elevation of the interior of Africa gives this region a lower average temperature than that of the valley of the Amazon. The people construct permanent dwellings which are grouped in villages, and though surrounded by a luxuriant vegetation, many of the tribes domesticate animals and till the ground in a rude fashion. They are further advanced towards civilization than the tribes of the Amazon, but are still indolent and unprogressive.

Polar Regions In sharp contrast with the climate and life of the tropics are those of the polar regions. These regions are characterized by long, cold winters, and short, hot summers. In the colder portions there are no forests, and vegetation consists almost entirely of a low order of plants, such as mosses and lichens, with which are mingled a few flowering plants that mature during the short summer. The soil thaws for only twelve or fifteen inches, and below this the roots come in contact with a bed of frost. These conditions are well illustrated in the tundra, a long belt of low and nearly level land in northern Siberia, containing many lakes and rivers. In winter the land is buried beneath a sheet of snow, but, with the coming of late spring, life wakens to great intensity. Groves of stunted trees occasionally occur around small streams, and serve to break the monotony of the scenery, and on the southern border shrubs greatly increase in size until they reach the line of forests. In the most favorable localities the cranberry, crowberry and whortleberry grow abundantly. The lower areas are covered with bog moss, and the higher lands with reindeer moss, and in summer are brilliant with flowers of many hues.

The lakes and rivers teem with fish, and the reindeer, polar bear and Arctic fox are about the only animals found on the land. The reindeer is domesticated, and supplies the inhabitants with milk and meat, and from its horns and hides tools, moccasins, clothing and other useful articles are made. It lives upon the reindeer moss which it procures in winter by digging in the snow with its forefeet. It is indifferent to cold, is a swift traveler, and is easily domesticated, making it a most valuable servant for the people who inhabit these inhospitable regions.

The inhabitants of the tundra are widely scattered, and belong to various races. They erect temporary dwellings, and during the winter follow the reindeer from place to place as they wander in

search of food. In those portions of North America corresponding to the Siberian tundra, we find a few Indian tribes who exist by hunting and fishing. Alaska and Greenland are inhabited by the Esquimaux, and the northern portions of Europe by the Lapps and Finns. In all these localities the entire strength and energy of the people are required to procure food, clothing and shelter necessary to a bare existence. There is, therefore, no opportunity for advancement beyond the occupation necessary for these purposes. The men are skilled hunters and fishermen, and display their ingenuity in fashioning such weapons and tools as they need, but they engage in no occupations save those directly connected with the procuring of materials for food, clothing and shelter.

Temperate Regions In the temperate regions we find conditions of well marked temperature seasons which are comparable with the tundra conditions for part of the year and with tropical conditions during another part. During spring-time and summer plants grow and mature, while during the remainder of the year vegetation rests. This makes it necessary for the inhabitants of the temperate regions to produce and gather in summer most of the material which they will need for food during the winter. Hence the people must be industrious and saving, with always a plan for the future. In these regions are found the most valuable grains, fruits and other food products, such as wheat, corn, the potato, the apple, peach, plum and many small fruits. The temperate regions are also the home of the most valuable domestic animals such as the horse, ox, sheep, and swine.

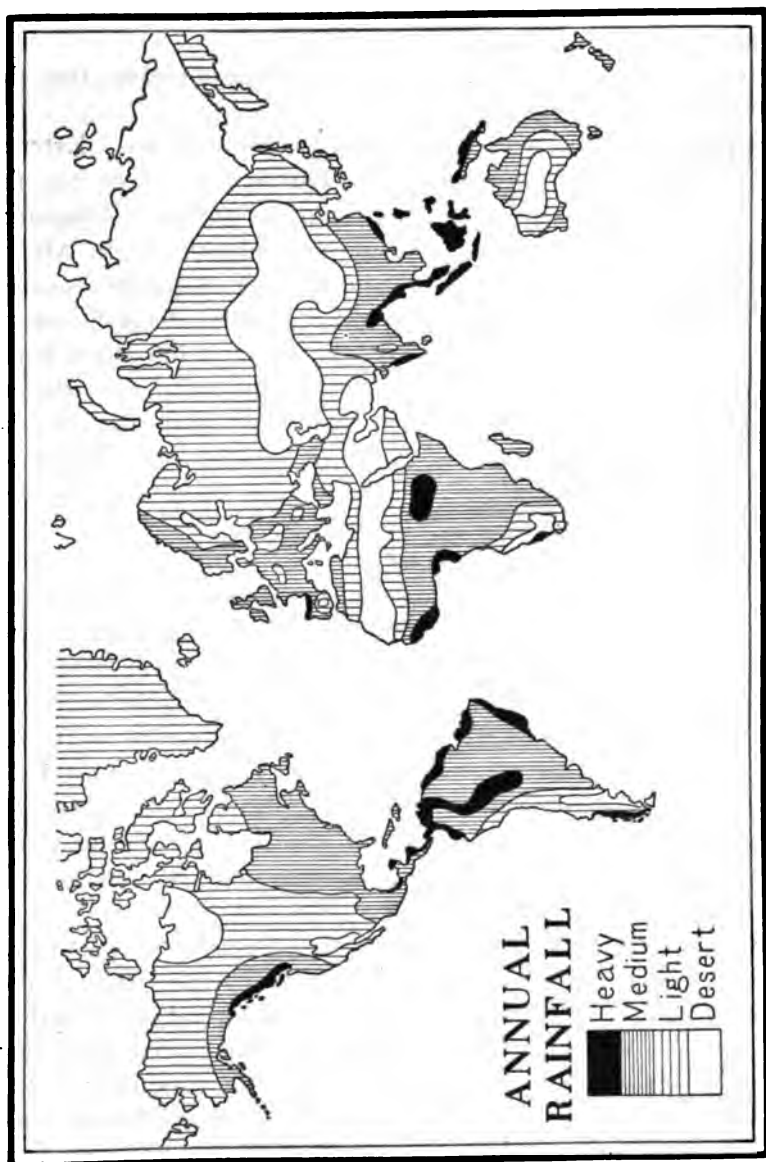
The inhabitants of the temperate regions have at their disposal a variety of resources. They live in a climate which stimulates them to activity, and amid conditions that provide opportunities for a great variety of occupations. Consequently these regions have been the abode of the great nations of civilization from the

remotest time, and it is with the people of these regions that the greater part of this book has to do.

MODIFYING INFLUENCES But there are regions within regions. Extending into the frozen, barren regions of the far north we find some regions having a temperate climate, with its characteristic plants and animals, as in Alaska and Norway. Within the tropics we find high mountains, covered with perpetual snow. In sharp contrast with the dense forests of the Amazon and the Kongo, are vast, barren areas like the Sahara, lying but a short distance away. Within the temperate regions we find a great variety of climatic conditions adapting different localities to different forms of life, and a variety of industries. The most important causes which produce these changes are rainfall, altitude, mountains and distance from the sea.

Rainfall The amount of rainfall of any locality depends upon its distance from the sea, the direction of prevailing winds, and its location in reference to mountains. The air obtains its supply of moisture from the constant evaporation from the surface of the land and sea; hence the ocean is the great source of rain. In general, places situated near the sea receive a greater amount of rainfall than those far inland, unless the prevailing winds blow from the land to the sea. Europe, whose area is small, and the basins of the Amazon and Kongo have an abundance of rain; but, with these exceptions, in the interiors of continents are found extensive arid regions and deserts.

Winds carry water vapor a long distance. If the prevailing winds blow from the sea to the land, and do not rise over mountains near the coast, they carry the moisture far into the interior. Whenever winds are forced to rise they become cooled and cause rainfall. Winds are forced to rise under two conditions: (1) Whenever winds blow over mountains, as along the Pacific coast of the United States, they cause heavy rainfall over the land on



the windward side to a distance of several hundred miles. (2) Whenever the land becomes heated the atmosphere above it will become heated, expand, and rise. As it rises it cools, and the moisture is condensed and falls. This accounts for the heavy rainfall in those regions near the equator.

The Great Central Plain, extending from north to south between the mountain systems of North America, enables the warm winds from the Gulf of Mexico to carry their moisture far to the northward and thus water the fertile prairies of the Mississippi Basin. But the western portion of the Great Plain is arid because the winds from the Gulf rarely reach the higher land to the west with any force, and the winds blowing over the Rockies become descending currents on the eastern slope, and as they fall they gradually grow warmer and their capacity for absorbing moisture constantly increases, thus drying the land.

Whenever there is heavy rainfall it is because the winds are blowing in such a way as to be getting cooler. Deserts are places where the rainfall is less than ten inches a year, and hence they are unproductive. They are caused in one of three ways: (1) By air currents descending constantly over one region, as in southern California and Arizona. (2) By a region being so surrounded by mountains on every side that the moist winds cannot get to the region, as the Great Basin about Great Salt Lake and the plateau desert of Thibet. (3) By winds which blow from a cool to a warmer region and so take up moisture as they get warmer, as the Desert of Sahara. In general, winds blowing from the sea towards the land, and those blowing from a warmer to a cooler region, are winds containing enough water vapor to produce rain; while winds blowing from the land to the sea and from a cool to a warm climate, have their capacity for moisture constantly increased, and produce clear skies and fair weather.

Rainfall affects the character and amount of vegetation, and

to a considerable extent the industries of a locality. Agriculture cannot be successfully followed without irrigation where the annual rainfall is less than twenty inches, and for the best results it should be from forty to fifty inches, and evenly distributed over the growing season. These requirements greatly restrict the agricultural regions, and large areas whose soil is capable of producing abundant crops remain almost barren for lack of water. In comparatively small areas, as the Nile valley, the densely populated portions of China, and, in the United States, sections in Utah, Arizona, and the southern part of California, the necessary moisture is supplied by irrigation.

Semi-arid regions, like the western portion of the Great Central Plain in the United States, Arabia, portions of Mongolia, and the interior of South Africa, have sufficient rainfall to produce a good crop of grass, and are valuable for grazing purposes. Regions having a hundred inches or more of rain are usually covered with dense forests, and are sparsely populated.

Next to latitude, altitude is the most important cause that affects climate. The average temperature of a place falls one degree for every three hundred feet of elevation above sea level. By ascending a hill three hundred feet high, we should experience as great a change in temperature as in traveling from thirty to sixty miles north or south from the tropics.

People who ascend high mountains in tropical regions pass through all the changes of temperature that they would experience in going from the equatorial to the polar regions, but they do not encounter all the climatic changes found between the torrid and frigid zones on account of the local conditions which affect moisture and prevailing winds. High plateaus, even though located in the equatorial regions, have a cool climate, and the lofty peaks and high mountain ranges of these regions, like those of the Andes and the Himalayas, are covered with perpetual snow.

Mountain Ranges Mountain ranges have great influence on climate on account of both their elevation and their effect on winds. In the Americas, the mountain ranges extend north and south. The Rocky Mountains prevent the winds from the Pacific from reaching the great plains in the interior of



A VIEW IN THE HIMALAYAS

Though they are in tropical latitude these peaks are covered with perpetual snow.

the United States, and, as will be more fully explained later, these plains have but little rainfall. However, these mountains do not form a barrier to the cold winds from the north, consequently the eastern portion of North America, including parts of Canada and the United States, have a mean temperature, lower than that of

portions of Western and Southern Europe in the same latitude. The Andes produce a similar effect upon the countries of South America. The great mountain ranges of Eurasia extend east and west. In Europe the Alps, and in Asia the Himalayas, protect the regions to the south of them from the cold north winds, and are the means of giving to these respective localities their salubrious climate. Were it not for the Alps and the Pyrenees, Italy would not have her sunny skies, nor would Spain supply our markets with raisins. Were it not for the Himalayas, India would be deprived of her tropical forests, and of the rainfall which enables her soil to sustain millions of people.

QUESTIONS.

What advantages do the tropical regions have over the polar regions? Do the polar regions have any advantages over the tropical? If so, what are they?

Do all parts of your state have the same amount of rainfall? Explain why in summer one portion of a locality may have a heavy fall of rain while an adjoining portion receives none.

What is the difference between rain and dew? Between dew and frost?

CHAPTER II.

SOIL AND PLANTS.

SOIL At the foot of a cliff or large rock, you find a pile of fragments grading in fineness from large pieces down to minute particles no larger than grains of sand. Usually the largest pieces are near the foot of the cliff and on top of the pile, and the finest farther away and at the bottom, where they gradually mingle with the adjoining land so that it is difficult to determine what part has been formed from the crumbling of the rock and what from some other sources. These fine particles of rock formed from the decomposition of the cliff constitute a portion of the soil at its foot, while other portions have been formed by the decomposition of other rocks, either near by or at a distance.

What Soil Is We usually apply the term soil to that portion of the surface of the land that has a depth of from six to ten inches. The greater part of the soil is formed by the decomposition of rock and a small portion by the decay of vegetable and animal substances, such as leaves, stems, roots and even whole plants, and the bodies of dead animals. The portion formed by the decay of these organic remains is called *humus*, and is very essential to the growth of plants.

Rocks are decomposed by weathering, by the action of water, by the action of wind, and by plants. The repeated warming and cooling through successive changes of temperature in the air, causes rocks to alternately expand and contract to a slight degree. This produces minute cracks into which water runs. In winter the water freezes and makes the cracks larger, so that the next season

they hold more water, which in its turn freezes and forces the pieces still farther apart. In this way, in the course of years, fragments are broken off, which in turn become reduced to small particles and form soil. The process is slow, but it is constantly going on.

Heavy rains and melting snows wash the surface of the rocks and carry away small particles. Running water also continually wears away the rocks over which it moves. The particles are carried down stream and deposited at the mouth or along the banks, forming beds of deep, fertile soil, like those along the lower part of the Mississippi and other large rivers. It is estimated that the Mississippi deposits in this way one hundred and fifty million tons of fragmented rock each year. In the arid regions, winds are constantly wearing away the rocks and depositing the particles in masses called dunes. In form and size these often resemble drifts of snow. Plants aid in the formation of soil by decomposing the rocks with which they come in contact, and often by breaking them up by the roots growing into the crevices. The force of the growing roots is often sufficient to split the rock in pieces.

Kinds of Soil Since soil is formed almost wholly of decomposed rocks, we should expect it to have the same composition as the rock in its locality, and such is the case, except where soil has been transported and deposited by water or ice, as along rivers and in beds of old lakes. According to its composition soil is known as sandy, clayey, limy and loamy. The soil is sandy when one-half, or more, of it is composed of sand, and clayey when it contains enough clay to make it hard and compact when dry, and plastic when moist. The limy soil is composed of about one-fifth lime and is usually formed from decomposed limestone. A loamy soil, or loam, is a happy mixture of these different kinds, so as to make it most suitable for cultivation. It may be known as sandy loam, clayey loam, or limy loam, according to the amount of sand, clay or lime that it contains.

A light soil is one that drains well, and is so porous that the roots of plants can penetrate it to a considerable depth. A heavy soil is usually compact, does not drain readily, and often contains so much water that it cannot be profitably cultivated until drained.

Fertility A fertile soil is one in which plants grow and thrive. It contains a good proportion of substances upon which the plants feed, and which, taken together, are known as plant foods. The most important of these are nitrogen, the most abundant ingredient of the air, and compounds containing potash, phosphorous, lime and sulphur. These substances must not only be present in the soil, but they must be in such a form that the plants can obtain them. That is they must be dissolved by the water present so that they can be taken into the plant through its minute rootlets.

For this reason, water is necessary to the productivity of the soil. For the best results, the amount of moisture must be such as will dissolve the required quantity of plant food, and also supply the plants with all the water that it is necessary for the roots to absorb. More than this is injurious, and if free water, that is, water that is not absorbed, is present, it prevents proper circulation of the air in the soil, and drowns the roots. The moisture most valuable to plant growth is that which surrounds each particle of soil with a thin film, similar to a film that sticks to a marble when it is dipped in water. The finer the soil, the greater the amount of surface it presents to the water, and consequently the more water it can contain without becoming saturated. If you do not have access to a field or garden, study the soil in your flower-pots, and notice that the plants having a fine soil with a good quantity of humus, and just enough water to keep it slightly damp, thrive the best. If too much water is present, the plants often fade and some of their leaves turn yellow and drop off.

By raising the same crop on a given field year after year,

most of the food which that particular kind of plant, as wheat, corn, or cotton, requires, becomes exhausted, and each successive year the yield is less. Good farmers prevent the exhaustion of the soil by what they call "rotation of crops," as raising wheat on a field one year, potatoes the next, corn the next, and following this by clover. They also increase the fertility by the use of manures and fertilizers. Green crops when plowed under increase the fertility of the soil. Plants which belong to the pea family, the legumes like clover, alfalfa, cowpeas, etc., actually increase the amount of nitrogen in the soil. Some fertilizers add plant food to the soil, while others increase the fertility by combining with substances in the soil and setting free the plant food that it already contains. The same fertilizer is not equally valuable for all soils, and the successful farmer learns what sort of fertilizer is best suited to a given field before applying it.

The most productive soils are found in the river basins, on the low slopes of hills, among the foothills of mountain ranges, in the beds of ancient lakes, and on the great plains, wherever there is sufficient rainfall for agriculture. Such regions sustain dense and prosperous populations, while those regions having poor soil, as those near the summit of mountains and on the highlands in hilly country, are unable to produce large crops, consequently such regions are sparsely settled, and their people are usually poor. This is the reason why the most prosperous farming communities in our country are found in the prairie regions and river basins.

THE WORK Over some large sections of country the soil is
OF ICE much deeper than over others. This is largely
due to the work of ice. In a past geological age, northern North America was covered with a great ice-sheet as far south as the Ohio and Missouri Rivers. This ice-sheet resembled, in structure and appearance, the glaciers now found in Switzerland, Alaska, and other localities. This ice moved towards the

south and southwest, very much as the glaciers move down the mountains. In many localities it pulverized the rock into soil, which, as the glacier melted, was deposited in its path; in other localities it levelled hills and filled up valleys and lake basins. From many of the elevated regions it carried the soil to the lowlands, and, in general, it moved the soil from north towards the south. For this reason, most of the New England and northern states in the region of the Appalachian Highlands have a thin and a comparatively poor soil, while in the lower land of the northern central states the ice-sheet deposited a deep, rich soil. In the southern states the soil has been made very largely from the decay of the limestone underneath.

PLANTS Plants, like animals, have a choice of food; some requiring large quantities of one substance and some of another. Wheat requires more nitrogen than oats, and barley more potash than wheat. It is probably safe to say that no two kinds of plants take the same food in the same proportions.

Some plants require much more moisture than others. Rice will grow only where the ground can be covered with water after planting. The cactus will thrive on the dry plains of Arizona and New Mexico, where rain seldom falls; while wheat, oats, and all the common farm plants require a medium amount of moisture. Corn thrives with less moisture than wheat or oats. The soil of lowlands usually contains more water than that of the highlands; therefore, some crops are better adapted to the hills and others to the valleys. We seldom find corn planted beside a stream, or wheat on a dry knoll.

Adaptation of Plants Some plants have much greater power than others of adapting themselves to different soils and localities. Rice can be successfully grown in the United States only on the lowlands of Louisiana and the Carolinas, while wheat thrives all the way from the Ohio River to

Hudson Bay. The sugar-maple grows to gigantic proportions among the granite hills of New England, but cannot live on the prairies of Illinois; while the willow thrives equally well in both localities. Many other similar illustrations can easily be found.

Plant Regions These peculiarities of plants and soils, combined with temperature, produce many well defined regions in which certain plants thrive better than others. Farmers take advantage of this fact, and raise the largest crops of those plants which thrive best in their locality. The farmers of Dakota and Minnesota raise wheat; those of Iowa, corn; those of Georgia, cotton; and those of Cuba, tobacco and sugar-cane. It is owing to these conditions that we have our agricultural regions designated as wheat belts, corn belts, and cotton belts. A careful study of plants and soils teaches us that the industry of every locality is largely dependent upon the nature of its soil, its temperature, the amount of moisture it receives, and the adaptation of certain crops to these conditions.

Providing mankind with food, clothing, and shelter, constitutes the bulk of the world's business. The soil is the great storehouse from which most of the material for this provision is obtained, and for the purpose of fashioning this material into useful products machines are invented, factories are built, and men and women engage in toil.

QUESTIONS.

Are any farms in your locality more productive than others? How do you account for their being so?

How can you tell clay soil from sandy soil?

Why will some plants thrive on a hillside and not on low land? Why do others die when taken from comparatively dry to wet soil?

Explain the relation of rainfall, temperature and soil to the leading crops raised in the locality in which you live.

NOTE.—Collect samples of soil from different localities, such as the top of a hill, a valley near a stream, the roadside, etc., and compare them as to color, composition and texture. Try to name each sample.

CHAPTER III.

WHY MAN ENGAGES IN TRADE.

Uncivilized people have but few wants, and supply these with their own hands. This is the condition in which our forefathers found the Indians when they settled the country. It is the condition of the dwarfs, and numerous other tribes of the interior of Africa today. All trade is for the purpose of satisfying man's wants, and just as soon as a person discovers that another has something that he himself does not possess, he attempts to give something of his own in exchange for it. If the second man wants what the first has to offer more than he does the articles in his possession, the exchange is made. In such an exchange, each has gained, for he believes that the article which he now possesses is of more use to him than the one that he gave in exchange for it. As soon as this discovery is made, trade springs up between individuals and tribes.

Commerce is so old that we cannot tell when it began. The records and relics of the oldest people about whom we have been able to learn, show that they engaged in commerce. The Indians, when first known to white men, carried on a rude commerce between tribes situated some distance from each other, and as soon as these people and the Europeans became acquainted, they engaged in trade, showing that the red men knew something of the advantage to be gained in an exchange of products. From such small beginnings in the distant past, commerce has continued to increase from century to century, until now it is the greatest single industry in the world. The principal reasons for this growth are :

**NEW
DISCOVERIES**

As soon as the average person learns of something new he wants it. When the Indians learned of the steel tools of the white men and saw what could be accomplished by their use, they were exceedingly anxious to supply themselves with these tools, and were willing to give, in exchange for them, furs that, to the French and English traders, were worth many times the value of the implements. As these traders became acquainted with the character and wants of the Indians, they introduced other articles, and in this way built up a fur trade, which has continued even to the present day. This trade gave rise to great corporations, the chief of which was the Hudson Bay Company, one of the most powerful organizations that has ever existed in America. The fur trade also has made men wealthy, and led to the exploration, by white men, of that vast interior of continent which now comprises the greater part of Canada and the United States.

The introduction of American products into Europe was equally advantageous. New plants, such as the potato, tobacco, and cinchona, were early introduced into England and other countries of the old world. Their use soon became so general as to lead to great industries in the English colonies. The tobacco trade was the foundation of Virginia's prosperity, and the first step which led to the introduction of slavery into the United States. These are only a few instances which illustrate how each new discovery and each new invention has created new wants, and that the desire to satisfy these wants has led to the exchange of products.

**DIVISION
OF LABOR**

Among savage nations, partially civilized people, and even civilized people settling in a new country, each family supplies nearly all its own wants. This makes it necessary for each one to engage in a variety of occupations. As a result, no one becomes skilful in any occupa-

tion. This was the case with the early settlers of New England. The men of the family tilled the land, made and repaired the farm implements, harvested and threshed the grain, and often ground it into flour in a rude mill of their own construction. The women of the household, in addition to caring for the house, spun the yarn, wove the cloth, and made the garments for the family. Every farmer had to keep on hand numerous tools that were only used occasionally, and every house contained a spinning-wheel and loom. Under these conditions, but little progress was made, since, from year to year, it was all that each family could do to supply the necessities of life.

As communities became established, people learned that it was more economical for some to do one thing continually and others another. Some men in the old New England settlements soon showed greater skill than others in the making and repairing of farmers' implements, and farmers soon learned that it was better to engage such men to do this work and pay them in the produce of their farms, than it was to do the work themselves. They had better implements, and secured them at less expense. Moreover, if they did not have to repair their own tools and implements, they could dispense with a great many tools that before were necessary.

This is a good illustration of how occupations arise in any community. Each occupation supplies some want, and if that want contributes to the welfare and true happiness of the people, it helps all other occupations. This is what we mean by division of labor. Under such a plan of work, each member of a community engages in the occupation for which he is best fitted. Each workman becomes skilful in his work because he gives his entire attention to it. He can also produce more than he could if he were to engage in several occupations. Hence we have carpenters, blacksmiths, merchants, farmers and those engaged in numerous

other occupations. Of course all tradesmen supply their wants by an exchange of products. Look about you and see how many different occupations there are in your vicinity, and then try to find a good reason for each.

APTITUDE By aptitude, we mean natural ability or inclination to do anything. As already stated, we find that some people like to do one thing better, and some another. Each naturally desires to follow the occupation that he likes. One wants to be a mechanic, another a farmer, and another a musician. Others want to be artists, and still others professional men, and so on. But each of these will try to find the opportunity to do what he likes, and out of these desires a variety of occupations arise. This is only another way of saying that we shall have division of labor within each community, which leads to the exchange of products; but in this case the division of labor arises more from the desire of the individual than the interests of the community.

LOCAL INDUSTRIES Some localities are suited to one line of industry and others to another. We cannot raise wheat and corn on mountains, nor mine gold and silver on the prairies. It is economical for the inhabitants of mountainous regions to give their time to mining, quarrying and lumbering, exchanging their products with the people of the plains; and it is just as economical for the people of the prairies to exchange their wheat and corn for the gold, silver, stone and lumber of the mountains. Each produce more than they could if they attempted to supply all their wants by their own labor. Manufacturing centers are built up on the same plan. In those localities where fuel and water are abundant, goods can be manufactured more cheaply, and usually to better advantage, than in mining or agricultural districts.

INFLUENCE OF TRAVEL As men have become acquainted with different countries and peoples, they have found some of the products of these lands and nations desirable.

Most of us would feel that we were deprived of a necessity if we could not get tea, coffee, or spices, and all of these are grown in tropical, or semi-tropical countries. Likewise, the people who raise tea, coffee and spices are glad to exchange them for wheat-flour, cotton goods, machinery, and other articles manufactured in the United States and European countries.

ADVANCEMENT OF CIVILIZATION

Means of travel are now so perfect and extensive, that each civilized nation has become acquainted with the whole world, and each nation is likewise making all parts of the world, whether civilized or uncivilized, acquainted with its industries. As this acquaintance is extended, new articles are discovered and a desire for them is created, and this leads to a further exchange of products. It has been said that raising the standard of civilization increases man's wants, and the extensive commerce carried on by the most enlightened nations would lead one to think this statement to be true.

QUESTIONS.

Why will a boy trade a knife for a ball, or a pair of skates for a dog?

Did the Indians engage in trade before they became acquainted with the white men? Why do you think so?

Can you think of any discovery or invention that has increased commerce? If so, name it.

What occupation would you like to follow? Why?

Show how the location of a factory in a town increases the trade.

Why has commerce increased so rapidly in the last twenty years?



CONDUCTORS OF CARAVANS IN AFRICA

CHAPTER IV.

TRANSPORTATION.

UNEQUAL DISTRIBUTION OF COMMODITIES

As we have seen, every locality is adapted to some special line of industry, and each individual has his preference for some particular occupation. These conditions lay the foundations for commerce; but without the necessary means of transportation trade between individuals or nations would be limited to very narrow restrictions. The third great factor in commerce, then, is transportation. The unequal distribution of commodities can be overcome only by carrying goods from the locality where they are produced to those localities where they are consumed. The principal agents in transportation are animals, railways, and water.

ANIMAL TRANSPORTATION

Among savage tribes all carrying of goods is by human labor, and in many of them this labor is performed by women, a custom which still exists in some portions of Africa and in some other regions far removed from civilization. In most parts of the world, however, beasts of burden have taken the place of men for transporting goods. However, there are some places where, because of the nature of the country, only men can be employed. In the interior of Africa, the forests are so dense that paths for the passage of the animals have not been made, and in some portions of that continent, the tsetse fly, whose sting is fatal to horses and cattle, makes it impossible to employ these animals for any purpose. Human labor is also used in the dense thickets of the Amazon and over some mountain trails where beasts of burden cannot travel.

This is the most expensive means of carrying goods. A man can carry but a few pounds—usually not more than sixty—and his progress is slow. When men are employed, they travel in



ELEPHANTS USED FOR PACK ANIMALS, CEYLON

large companies, called caravans; but this is only when other means of transportation are not practicable.

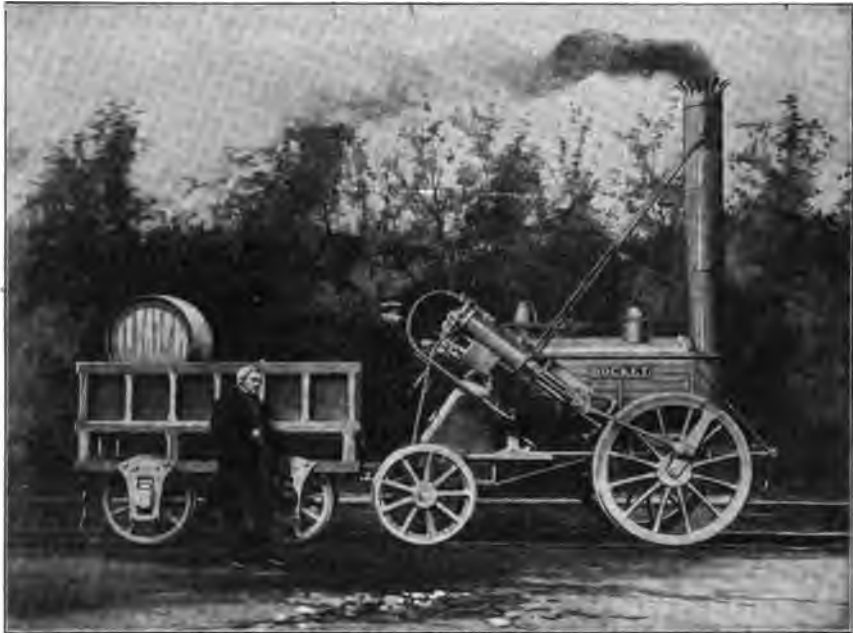
It would seem that animals have been used for carrying goods in all ages. The animal employed depends very much upon the

locality and the nature of the work. In the far north we find the esquimau using dogs to haul his sledge, while in Finland and Siberia the reindeer is used for the same purpose. The camel is especially suited to desert countries, because he can travel a long time without food or water. His feet are adapted to the sands and gravel over which he has to travel, and he is not affected by the intense heat; hence we find the camel in general use in northern Africa, Arabia, and a few other portions of western Asia. In India the elephant has been domesticated, and is often used as a beast of burden. In the mountains of South America we find the llama used to climb the steep and narrow mountain paths, and on the plains of Thibet the yak is employed for a similar purpose. With these exceptions, the horse, the ass, the mule, and the ox, are the beasts of burden of the civilized world. These animals are especially adapted to a temperate climate, and are more generally used than any others.

Roads Formerly, all transportation was by means of fastening goods to the animal's back, but later the cart was added, and the animal hauled the load instead of carrying it. The use of the cart necessitated the construction of roads, and as the vehicle improved in size and style, broader and better roads were required.

Country roads are of two kinds, generally known as dirt roads and stone roads. The dirt road is made either by wearing a path over the land by continuous travel, or by plowing and scraping the soil into a rounded form for a roadbed. This is the kind of road found over most of the United States. Dirt roads are very unsatisfactory; in dry weather they are laden with dust, and in wet weather the depth of mud makes them almost impassable. Stone roads are usually called macadamized roads. They are made by treating the surface with crushed stone, which is rolled down and pressed into the earth by a heavy steel roller. These roads have a hard, even surface which is seldom affected by

frosts or rain, and remains in good condition for a long term of years. The British Isles and most of the other countries of Europe have roads of this sort. While transportation by animals is much cheaper than that by human labor, it is still very expensive. Good roads tend to lessen the expense to a consid-



THE "ROCKET," THE FIRST SUCCESSFUL LOCOMOTIVE
From the photograph of a model in the Field Columbian Museum, Chicago

erable degree, and are of the greatest importance in agricultural districts.

RAILROADS Railroads are the outgrowth of the attempt to construct good roads, and were first designed for carriages hauled by horses. The first railroads in which we are

interested were built in England early in the seventeenth century, for the purpose of hauling coal from the mines. They had wooden rails fastened to wooden sleepers. The first great improvement over this style of road was made by fastening a thin plate of iron to the upper surface of the rail, and in about 1790 iron rails came into use.

In 1825, a railway was opened between Stockton and Darlington, England. This road was thirty-seven miles long, and it was the intention of the managers to haul the carriages with horses. In 1829, George Stephenson invented the first successful locomotive. This machine was able to travel at the rate of from sixteen to twenty miles an hour, and to haul a heavy load. Stephenson's invention marks a new era in the history of the world. It changed the method of transportation by land, and made the opening up of new countries a possibility.

The first railroad in the United States extended from the granite quarries in Quincy, Mass., to the coast. It was a road having wooden rails with iron straps. The first use of this road was to haul granite for the construction of Bunker Hill monument. In 1830, the Baltimore & Ohio Railway was opened for traffic, and this date also marks the beginning of the use of the locomotive in the United States.

Railways are now found in nearly all civilized countries. Notwithstanding the fact that water transportation is cheaper than transportation by rail, all of the countries of Western Europe, as well as the United States, have most of their goods carried over railways. Lines are constructed, not only between the great centers of trade like London and Liverpool, or New York and Boston, but also across vast stretches of country connecting ocean with ocean like the transcontinental lines in the United States and British America, and the Trans-Siberian Railway extending from Moscow to the Pacific coast. Up to the present time nearly all

great trunk lines of railway run east and west, but the Cape-to-Cairo Railway now in the process of construction through Africa extends north and south.

Railway transportation is economical because it is so much quicker than any other, and with many classes of freight, such as fruit, fresh meat, and other perishable material, time is an important factor. Railways seek centers of trade, and we find numerous lines meeting in all large cities.

The present railway is as great an improvement over those first constructed as the original railway was over the dirt road of the country. Forty years ago a good freight locomotive could haul a load of about four hundred tons on a level track, but since the invention of Bessemer steel, locomotives are constructed that can haul from four to five thousand tons more easily than the older ones could one-tenth of that amount. There has also been a great improvement in speed; through-freight trains now travel at a higher rate of speed than did the passenger trains at the close of the Civil War.

Electric Railways In addition to the steam railway whose construction requires great expense and is confined to sections of the country over whose surface the roadway can be graded, we now have the electric railway threading many agricultural communities and making transportation from the country to the town both cheap and easy. The electric railway uses lighter cars and motors, and can be operated over grades that are impracticable for steam railways. On this account it is fast becoming a very important factor in the transportation of passengers and merchandise. The electric railway in the country is of great benefit to the farmer. It carries his produce to market and leaves him time to produce more — another illustration of the benefits derived from the division of labor.

**TRANSPORTATION
BY WATER**

Rivers are our most natural commercial routes. They connect the coast with the interior of the country, and by following them, communication along their course is made cheap and easy. The great rivers have ever been the natural highways of commerce. Even the uncivilized nations living along their banks always engaged in trade with tribes living farther up or down stream. The great commercial rivers of Europe are the Rhine, Rhone, Elbe, Oder, Vistula, Danube and Volga, and it is next to impossible to find a time when these streams were not important channels of trade. The old rowboats of the ancients have now given place to those propelled by sail and steam. We find great cities at mouths of these rivers and on their banks. The value of many of them for transportation has been improved by removal of obstructions, such as blasting the rock from Iron Gate in the Danube, and also by deepening their channels through dredging.

Streams that have been deepened in this way are often called canalized rivers. Russia's navigable rivers measure over 30,000 miles, and exceed in extent those of any other country. France, Germany and Austria also make extensive use of their native streams. In India the Ganges, in China the Yangtse, and other rivers are equally important for those countries; the Amazon and Platte and their tributaries admit large boats for more than a thousand miles from the coast, while the St. Lawrence and Mississippi systems connect the vast interior of North America with the sea.

Canals Canals are constructed either to enable boats to pass around an obstruction, like falls or rapids in a river, or for the purpose of shortening distances between points. The Welland Canal in Ontario is a good illustration of those constructed for the first purpose. This canal overcomes the difficulty presented by Niagara Falls, while the Kiel, or Kaiser Wilhelm Canal, con-

necting the Baltic and North Seas, is a good illustration of the second. The Suez Canal is the most important ship canal now completed. It is 100 miles long, 400 feet wide at its surface, and 31 feet deep. Its construction completely changed the ocean routes between Europe and the East. By passing through the Suez Canal and the Red Sea, ships from European ports save over 4,000 miles in going to Calcutta or ports in China and Japan, and more than 4,000 ships pass through this canal in a year.

The Panama Canal, now in the process of construction, will, when completed, be of even greater importance, and will change the course of much of the commerce now carried on between European and Asiatic ports, and Europe and Australia. This canal will also shorten the voyage of ships passing between the eastern ports of the United States and the western ports of South America more than 4,000 miles.

Other important canals saving distances are the Caledonia, extending across the southern part of Scotland, and the Corinth Canal, crossing the peninsula of Greece. Numerous canals exist in the United States and European countries for the purpose of connecting lakes with rivers, or connecting rivers with each other. All these make transportation cheap and easy.

Ocean Routes The sea is the highway of nations. Upon it most of our international commerce is carried, and established ocean routes between all important countries and seaports have been in existence for centuries. Formerly, sailing vessels alone were used, but even before the application of steam power to the hauling of merchandise over the land, this power was applied to navigation. Of almost equal importance to the invention of the locomotive by Stephenson, was the invention of the steamboat by Robert Fulton, in 1807. The first steamboat crossed the Atlantic in 1819, and the trip required twenty-two days. The first ocean steamers were propelled by paddle-wheels, and were smaller than

many boats now found upon large lakes. They were slow and could carry only small cargoes.

The first great improvement in ocean steamers was the introduction of the screw-propeller in place of the paddle-wheel. With this change of motor came the change in plan which has given us the ocean liners noted for their size, speed and safety. Some of the largest of these ships are more than 600 feet in length, and the swiftest of them can make the trip from New York to Liverpool in less than six days, while the average freight steamers require about nine days. Some of these ships can carry a cargo of 20,000 tons, and as the result of the perfection in machinery and the increase in the size, expense of carrying freight has been greatly reduced. It is now possible to carry wheat from Dakota to Liverpool at a price not exceeding 21 cents per bushel, and the rates are proportionately low for other distances. There were, at the beginning of the twentieth century, about 90,000 sailing vessels, and 30,000 steamships engaged in the world's commerce. Of this number, Great Britain and her colonies claimed about 35,000, and the United States some over 20,000.

National governments aid navigation by removing obstructions to the entrances to harbors, constructing piers, building and maintaining lighthouses and buoys to mark dangerous shoals, or to guide vessels through the proper channels when entering or leaving harbors. They also establish rules for the management of ocean-going vessels, when within three miles of shore, so that no one shall trespass upon the rights of another, or place other vessels in danger by running at a high rate of speed in narrow and dangerous channels. All large vessels are taken into and out of port by pilots who, having thorough acquaintance with the harbor, are able to guide the ships through the most tortuous channels.

Transportation by water is cheaper than by land, because most

of the waterways are natural, like seas, lakes, and rivers, while roads and railways must be constructed at great expense. Another reason is that the same quantity of freight can be carried on ship at less actual expense of labor, fuel, and wear of machinery, than by rail.

QUESTIONS.

Why are not camels and elephants used as beasts of burden in the United States?

What sort of wagon roads are found in your country? Can you tell how these roads might be improved?

How is money for building and repairing roads obtained?

Which would you prefer: a trip by rail or one by boat? Why?

Why can electric railways be constructed where steam railways can not?

Of what advantage is the electric railway to those who live in the country?

Why are locks placed in canals? How do they operate?

Did you ever see any work that had been erected by the government to aid navigation? If so, what was it?

PART TWO.

THE UNITED STATES.

CHAPTER I.

POSITION, SURFACE AND CLIMATE.

POSITION The United States occupies the central portion of North America, extending from the Atlantic Ocean on the east, to the Pacific Ocean on the west, and from the 49th parallel north latitude on the north, to nearly the 25th parallel on the south. Its greatest length from north to south is 1780 miles; its greatest breadth from east to west is 3100 miles, and its area including Alaska, is 3,595,600 square miles. It is exceeded in area by the British Empire, the Russian Empire and the Chinese Empire, but it excels each of these in the advantages of its geographical position.

PHYSICAL FEATURES The United States is naturally divided into five regions: (1) The Atlantic Slope and Coastal Plain; (2) the Appalachian Highlands; (3) the Central Plain and Lake Regions; (4) the Rocky Mountain Plateau; (5) the Pacific Slope. Each of these regions contains numerous subdivisions which are distinguished by their characteristics of surface, climate and products.

The Atlantic Slope In the northern section of this region, extending from the eastern point of Maine to Long Island, the mountains and hills approach near to the coast, the slope is steep, and the surface is very uneven and rocky. The soil is hard to till, but in many sections it is quite fertile, while

in others it is almost barren. The streams are shallow, clear and rapid, affording in many places excellent water power which is used to operate the numerous factories in this locality. Only a few of the streams are navigable, and these for but a short distance.

That portion of the Atlantic Slope extending from Long Island southward is frequently called the Coastal Plain. The hills and mountains here are farther inland, and the slope to the shore-line is gradual, terminating in a plain which in some places is nearly level. This plain is narrowest at the north, and gradually broadens until it reaches its greatest width in North Carolina opposite Cape Hatteras.

That portion of the plain next to the shore-line is low, level, and sandy, and the surface is poorly drained. This strip is about fifty miles wide, and rises inland from two to three feet to the mile. Adjoining this is a more fertile strip, whose slope is more rapid and drainage good. Large quantities of cotton are raised on this higher strip. Still farther inland, varying from fifty to one hundred miles, lie the low hilly uplands largely covered with forests of yellow pine. The cleared lands in this strip also raise excellent cotton and other crops. The lower plain contains extensive swamps and numerous lagoons. Here the rivers are sluggish, and many of them are navigable for steamers. At the point where the rivers descend from the higher to the lower plain, called the fall-line, good water power is afforded. Along this line, on most of the rivers, we find numerous manufacturing towns. Some of these, notably Philadelphia, Trenton, Richmond, Raleigh, and Augusta, have become important cities. At the mouths of some of these rivers, seaports are located. These make commercial connection with the outer world, while at the fall-line there is usually an industrial and commercial center for each locality. When, as in the case of Philadelphia, this center serves both purposes, it becomes a large city.

The Atlantic coast line is very irregular. In the north the highlands approach quite close to the shore, and the slopes are steep, giving to the shore waters sufficient depth to float the largest ships. The coast of Maine is dissected by numerous drowned valleys, and some of these, as Penobscot, Sheepscot and Casco Bays, form excellent harbors, and Portsmouth, N. H., is situated on a similar harbor. South of Cape Cod, we find the deeper indentations—Long Island Sound and New York Bay, Delaware Bay and Chesapeake Bay, on each of which are important seaports. South of Chesapeake Bay, the shore line is more even, the slope gentler and the offshore waters are more shallow. In many places are sunken reefs that make navigation dangerous. On account of these conditions there are very few good harbors along this division of the coast.

Appalachian Highlands This region occupies a long, narrow strip of country, beginning with the Laurentian Highlands and extending almost to the Gulf of Mexico. It consists of parallel ranges of low mountains, separated by narrow valleys, through which flow rapid streams. From north to south, these highlands are naturally divided into three sections: the northern, including the mountains of Maine, the White Mountains in New Hampshire, the Green Mountains in Vermont and Massachusetts, and the Adirondacks and Catskills in New York. The ranges in this section are more broken than in the other. In the past ages, glaciers rounded and smoothed some of the summits and denuded them of their soil, and, in some instances, so cut their way across the ranges as to form cross valleys that leave here and there solitary peaks. The Hudson is the only large river in this section that has cut its way to the sea through the ranges.

The middle section comprises the ranges extending from the southern part of New York to the Cumberland Gap. The princi-

pal ranges of this section are the Blue Ridge, the Shenandoah and the Alleghanies. These ranges are more nearly parallel than those of the northern section, and through them the Delaware, the Susquehanna and the Potomac cut their way to the sea.

The southern section extends from the middle section across Tennessee and North Carolina into Georgia and Alabama, the principal ranges being the Blue Ridge, Great Smoky and Cumberland. The division between the middle and southern sections is not distinctly marked, and the Potomac could be taken for the dividing line with equal propriety. The Appalachians reach their greatest altitude in the southern section, and here the ranges are almost uniformly parallel.

In each section, the valleys, through which the larger rivers reach the sea, form the natural gateways to the vast interior of the country, and it was through these that the earliest emigration proceeded westward. Later, traffic that arose from this emigration gave the towns, located on the lower course of the rivers, advantages which have made them great commercial centers.

Originally, the Appalachian Highlands were covered with forests, but in the north most of the valuable timber has been cut, though in Maine lumbering is still quite an important industry. In the south the forests remain, and in North Carolina and Georgia lumbering and the manufacture of tar and turpentine give employment to a large number of people.

In the middle section, numerous transverse valleys divide the highlands into distinct plateaus. Some of these valleys are so narrow as to resemble canyons, and streams flow through them all. Along the borders of these streams the soil is deep and fertile, and here we find many small but successful farms. The soil of the uplands, while admissible of cultivation, is not as fertile as that of the valleys.

The mineral resources of this region are almost boundless.

Granite, limestone, slate and marble are found in the northern division ; slate, coal, petroleum and iron in the middle ; and marble, coal and iron in the southern division. The development of these resources in Pennsylvania has been the chief cause of that state's prosperity, and the proximity of coal and iron to Pittsburg have made that city the greatest iron manufacturing center in the world.

Central Plain The Central Plain is naturally divided into three regions: the Prairie Region, the Lake Region and the Great Plains.

The prairie region extends from the western slope of Appalachian Highlands to the eastern border of the Great Plains, and from the Great Lakes and the Canadian boundary to the Gulf of Mexico, and embraces all of the most fertile portion of the great Mississippi basin. The western slope of the Appalachian Highlands gradually merges into the rolling prairies of Ohio, which, in turn, blend with the great level prairies of Indiana, Illinois, and other states bordering on the Mississippi. Save where it is broken by the Ozark Mountains, this vast region is practically treeless and level or slightly rolling. It is free from stones, and has a deep and fertile soil. With their excellent climate and abundant rainfall, the prairies are adapted to raising large crops, and they form the most important agricultural region of the world. It now sustains a population of over thirty millions, and besides, exports a large proportion of its products of corn, wheat, beef and pork to other parts of the Union, and to several of the countries of Europe.

The oil fields of the Appalachian Highlands extend through Ohio, and cover a small portion of Indiana. Considerable natural gas is also found in the same localities. Extensive beds of bituminous coal underlie Ohio, Indiana and Illinois, affording sufficient fuel to supply the entire country for centuries.

The rivers all flow into the Ohio, Mississippi, or Missouri. Most of these tributaries are small and shallow, and have only a

moderate current. Soon after the country was settled, canals were constructed connecting Lake Erie with the Ohio, and Lake Michigan with the Illinois River, but the numerous railway lines have now taken the place of these canals, and they are but little used. The most important cities and towns are on the banks of the rivers or where a number of railways meet. Some of these railway centers, like Indianapolis, Springfield and Topeka, are prairie towns. Chicago is a combined lakeport and railway center.

The basin of the Great Lakes touches the prairie region on the north, and blends with it so gradually that it is difficult to find the dividing line. Thence it extends northward into Canada. The land bordering on the lakes and between them is more rolling than the prairies, and the northern portion was originally covered with dense forests. The lumber in many places has been cut off, but sufficiently large tracts of woodland still remain to admit of a thriving lumber trade in northern portions of Michigan and Wisconsin. The even climate of this region, resulting from the presence of such large bodies of water, makes Michigan an excellent fruit-growing state, and large crops of peaches, apples and small fruits are produced. Wisconsin is valuable for the growth of cereals and livestock, and also for its dairy products.

The mineral resources of upper Michigan, and that portion of Minnesota bordering on Lake Superior, make this region one of the greatest copper and iron-ore producing sections of the world. The lake traffic is extensive, and many of the towns that were first started at convenient shipping points have grown into important cities that are now manufacturing as well as distributing centers; but their influence is of such importance as to deserve special notice in another chapter.

Great Plains These include the piedmont region, or extended foothills of the Rocky Mountains. They slope from the mountains as great rolling lands extending to about

the 100th meridian, where there is a fall-line similar to that on the Atlantic Slope of the Appalachians, but it is not as distinctly marked. Northward the region extends far beyond the boundary of Canada, and southward as far as the Plains of Texas. The rivers have formed many bluff-like valleys, as they have cut their way down the slope to join the Mississippi or its tributaries. The rainfall is not sufficient to admit of raising crops, and tilling the soil is confined to the land bordering the streams and to those sections where irrigation can be practised. Most of this region is given over to grazing, and the raising of livestock is its principal industry. From here thousands of cattle are shipped annually to the stockyards in Omaha, St. Louis, Kansas City and Chicago.

Rocky Mountain Plateau The Great Plains terminate on the west in a plateau having an average elevation of 5000 feet. Upon this as a foundation rise the numerous ranges that constitute the Rocky Mountains. Most of these ranges extend from the northwest to the southeast. The plateau from which they rise attains its greatest breadth on the line that forms the boundary between Colorado and Wyoming, and its western slope is much more rapid than the eastern. A number of other mountain ranges extend across this plateau from east to west, and divide it into well defined regions; the Columbian Plateau, the Colorado Plateau and the Great Basin.

The Columbian Plateau includes most of Idaho, Washington and Oregon. With the exception of the eastern portion the region is well watered, and in some localities on the western slope of the Coast Range the rainfall exceeds sixty inches. Here the mountains are clothed with heavy forests, and over nearly the entire region the valleys contain fertile soil and afford excellent opportunities for agriculture.

The Colorado Plateau includes a small corner of Nevada, most of Colorado, a portion of Utah, Arizona, New Mexico and South-

ern California. The entire region is arid or semi-arid. It contains many lofty peaks, deep gorges and rapid streams fed by melting snows. In portions of Arizona and New Mexico irrigation is practised and abundant crops are raised on small areas. The soil is fertile, and, with sufficient rainfall, this plateau would become one of the most productive regions of the country. The mountains abound in ore, and mining is an important industry of the region. The Colorado is the only river that has broken through the barriers of this basin to reach the ocean. Along its course are found those wonderful canyons which form some of the grandest scenery in the world.

South of the Columbian Plateau and west of the Colorado Plateau is an extensive region known as the Great Basin, because its rivers nowhere drain out to the ocean. The Basin is a high plateau surrounded by mountains, and having a rough, uneven surface. It includes nearly all of Nevada and Utah, and a portion of Oregon and California. The Great Salt Lake fills a depression in its northeast corner, and near the head of the Gulf of California is Death Valley, a remarkable depression which drops 300 feet below the level of the sea.

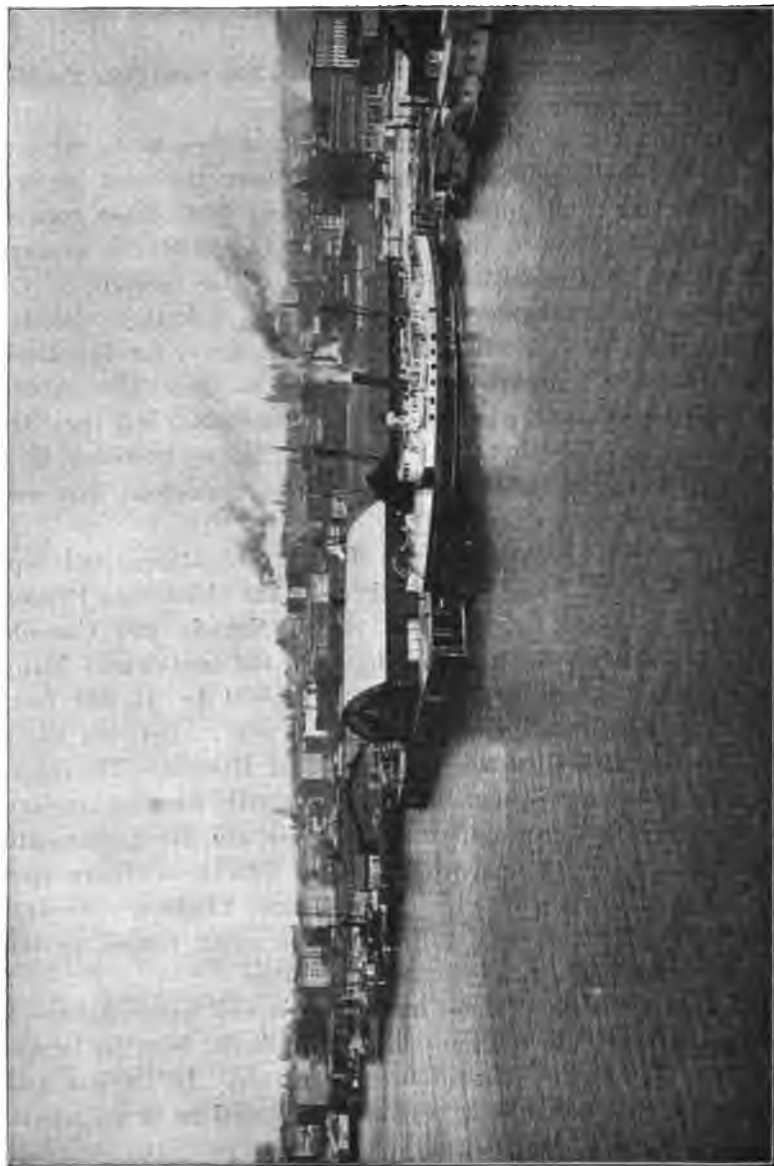
The great altitude of the Rocky Mountain region gives it a cool climate throughout the year, but the rainfall is not sufficient for agricultural purposes. In most of the valleys the soil is fertile, and where irrigation can be practised bountiful crops are raised, as in Utah, some portions of Colorado and the southern part of California. Several valleys contain pine forests and the surface of the open land is covered with a heavy growth of grass. These are good grazing regions, and, were markets accessible, might also be used for raising crops. Some of these valleys, like the Yellowstone and the Yosemite, have been reserved as national parks. There are also a number of transverse valleys, or mountain passes, through which the transcontinental railroads have found their way

to the Pacific coast. With the exception of the Canadian Pacific, all of these lines are within the United States.

The great wealth of this highland region lies in its mineral resources, of which gold, silver and copper are the most important. Since 1880, the gold and silver taken from these regions have amounted to more than \$4,000,000,000, and the average annual output still exceeds \$127,000,000. The location of the best of these mines has caused towns to spring up in their vicinity, some of which, like Leadville and Virginia City, for the time, became important industrial centers. Coal measures also extend along the eastern border of the Rocky Mountains, but they are still awaiting development. At no distant future, however, they will be the means of locating, in this region, numerous iron and steel mills and other industries.

The Pacific Slope West of the Rocky Mountains, and separated from them by the Columbian Plateau and the Great Basin, we find the Sierra Nevada and Cascade Mountains—two of the loftiest ranges on the continent. Many of their peaks attain an altitude of 12,000 to 15,000 feet, and are covered with snow throughout the year. Between these mountains and the sea are the parallel Coast Ranges. The intervening valleys constitute some of the most fertile farming country in the world. The most important of these are the Sacramento and the San Joaquin basins, which extend into the southern part of California; others extend northward into Oregon. Several streams have cut their way through these coast ranges to the Pacific, the most important being the Columbia.

The western slope of these mountains is well watered, except in the south, and their sides are heavily timbered from far in the north to the dry region of southern California. In Oregon and Washington a thriving lumber business is carried on in the mountain regions, while the fertile soil of the valleys produces abundant



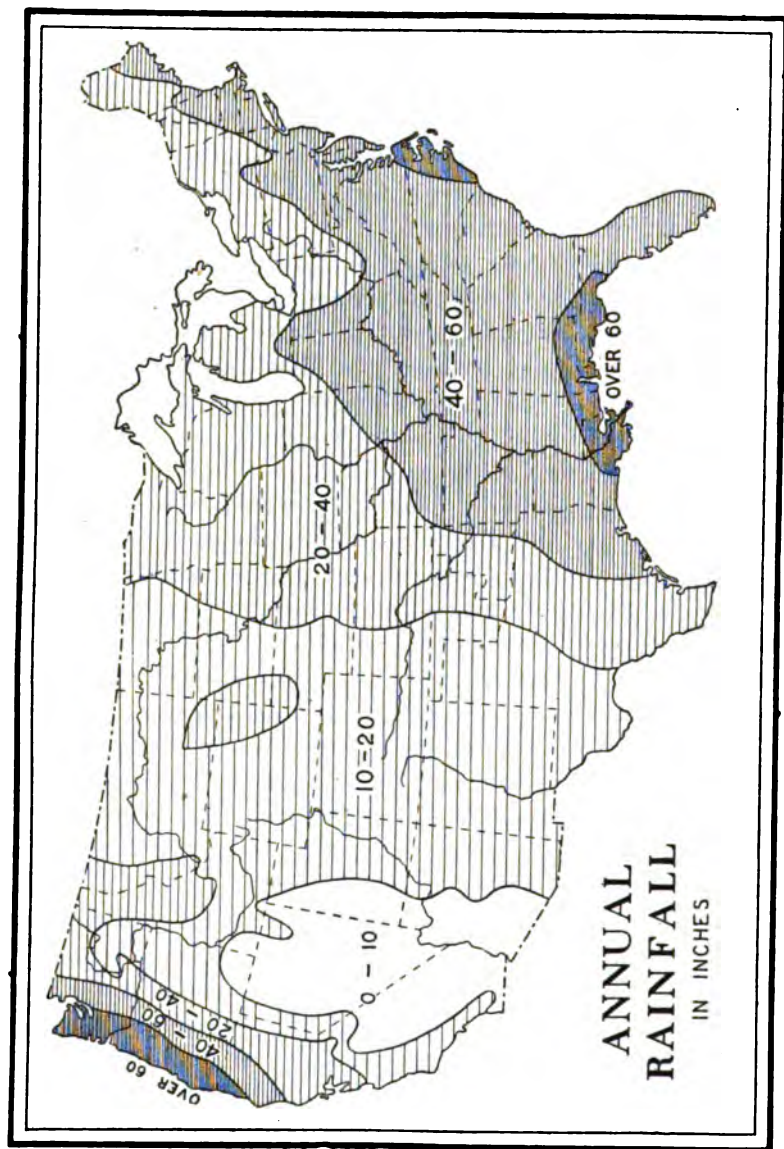
THE WATER FRONT, SEATTLE

crops of wheat, oats, corn and fruit. The valleys of California, in the northern and central portions of the state, grow excellent cereals and deciduous fruits; while the southern portion has become the most important fruit region of the country. The fruit farms are watered by irrigation.

It was in one of these valleys in Central California that gold was discovered in 1848, and this discovery caused such a flood of immigration that California became a state in 1850, some years before the vast territory between the Mississippi and the Rocky Mountains was even open to settlement. Since the discovery of gold within her borders, California has been one of the leading gold-producing regions of the world.

The Pacific coast line is much more regular than the Atlantic. San Francisco Bay and Puget Sound are the best harbors. On the first we find San Francisco, which is the commercial and financial center of the Pacific States, while Seattle, Tacoma, and Portland are important ports on the Sound and the Columbia River. San Pedro, in the southern part of California, is in the midst of the fruit region, and is the seaport for Los Angeles. San Francisco and the more northern ports have lines of steamers plying between them and the Hawaiian Islands, Australia, the Philippines and the leading ports of China and Japan. Steamers also ply between San Francisco and other Pacific ports of the United States and South America.

CLIMATE. The latitude of the United States is such as to give the country a climate ranging in temperature from semi-tropical in the extreme south to cool temperate in the north. East of the Rocky Mountain Highlands the temperature is affected but little by the altitude of the country, the low ranges of the Appalachian Mountains having only a local influence. The direction of the mountain ranges allows north and south winds alternately to sweep over the vast interior, which subjects this



region to sudden and sometimes extreme changes in temperature during the spring and autumn months. In the northern half of the country the winters are cold and the summers hot.

The great altitude of the Rocky Mountain Plateau gives to the entire western highland region a cooler climate than it would otherwise have. The Pacific Slope is influenced by the warm winds blowing over the Pacific, and has a warmer climate than places of corresponding latitude on the Atlantic coast. This region also differs from other portions of the country in having only two seasons, rainy and dry.

Rainfall The eastern half of the country has, without exception, an annual rainfall of more than twenty inches, and the precipitation is quite evenly distributed throughout the year. Both of these conditions are of great advantage to agriculture. A glance at the map shows that the Appalachian Highlands and Coastal Plain receive an average of from fifty to sixty inches of rain, while two small areas, one on the Gulf of Mexico and the other in the mountainous regions of North Carolina and Tennessee, have more than sixty inches. The 100th meridian separates that portion of the Mississippi basin, which is suitable for agriculture, from the western portion which, on account of the lack of rainfall, is suitable for grazing only. A few narrow valleys among the Rocky Mountains receive a good supply of rain, but most of this region is dry because the altitude of the Sierra Nevada and Cascade Ranges is such that air currents on the eastern slope are given a downward direction and are constantly growing warmer and having their capacity for moisture increased by dry winds blowing inland. The western slopes of these mountains and the intervening valleys are well watered because the incoming winds from the ocean are forced to rise over the mountains, and, being cooled, they precipitate their moisture, consequently, a section along the coast in Washington, Oregon, and Northern California

receives more than sixty inches of rain annually. In general, the rainfall on the Pacific coast diminishes from Washington southward, and the southern part of California falls within the arid region. Here intensive farming is successfully followed by means of irrigation.

This diversity of surface, soil, temperature, and rainfall, divides the United States naturally into well defined industrial regions, and the leading occupations in each have been determined by geographical conditions.

QUESTIONS.

What advantages do the United States derive from their geographical position? Are any other countries similarly situated?

How do you account for the numerous good harbors on the Atlantic coast?

What is the fall-line? Account for its location.

What portions of the Appalachian Highlands are best suited to agriculture? Why?

Over what routes did the people who first settled Ohio, Kentucky and Tennessee cross the mountains?

What are the boundaries of the prairie region in the United States? Why is this region so well adapted to agriculture?

Why are not the Great Plains as well suited to agriculture as the prairies?

Describe the climate of the Rocky Mountain region. How do you account for it?

How do you account for the heavy rainfall in some portions of Washington, Oregon and in the northern part of California?

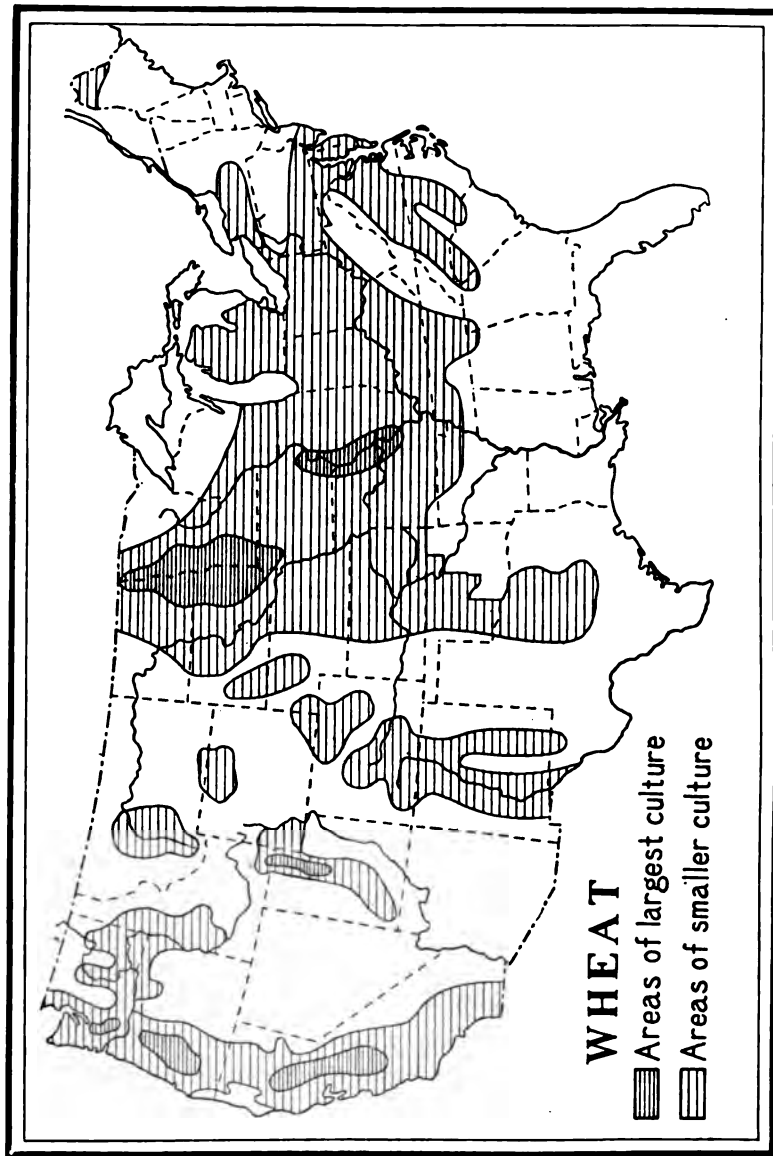
CHAPTER II.

WHEAT.

Wheat is one of the most valuable cereals and has been known from the earliest history. It was extensively cultivated by the Ancient Egyptians, and China knew it and used it more than 2000 years B. C. It also constituted an important article of food of other nations of antiquity. From that time to the present, wheat has been the principal food for civilized peoples. Its origin is not known, but its home is supposed to have been somewhere in Western Asia.

THE WHEAT PLANT

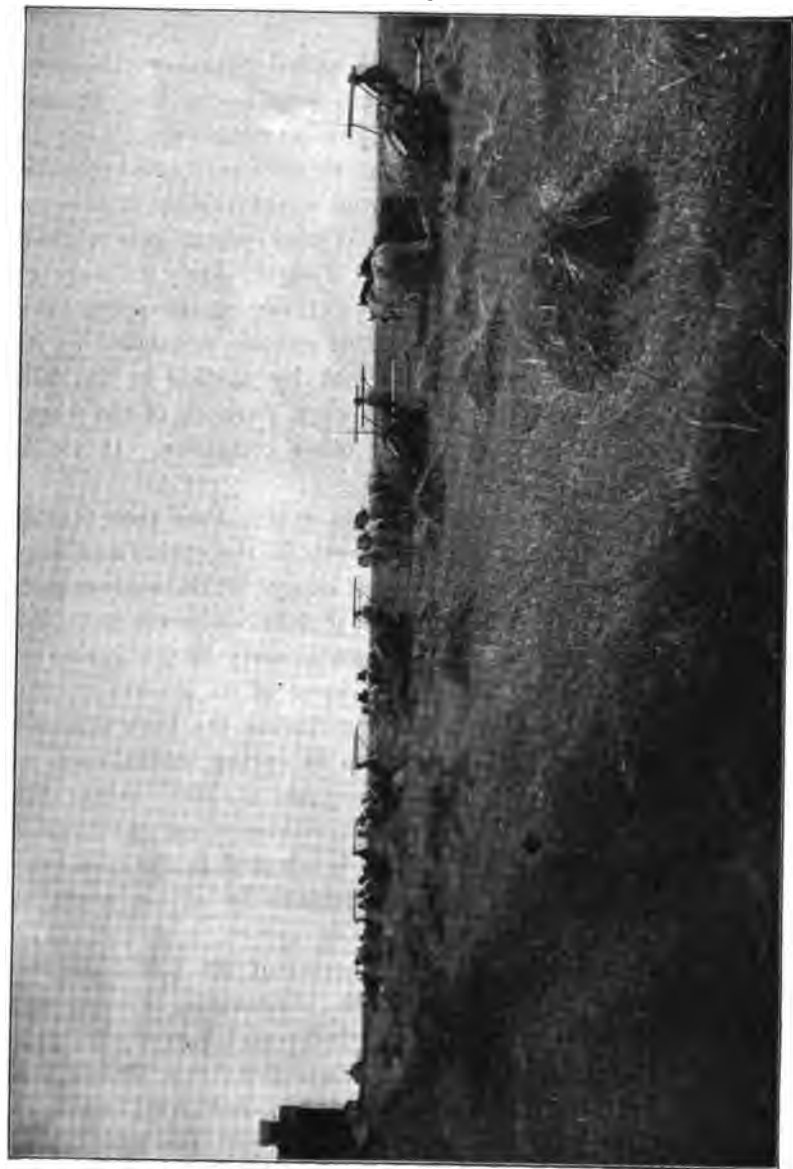
Wheat is adapted to a great variety of soils and climates, but thrives best in a soil formed from the decomposition of different kinds of rock that have been thoroughly pulverized and contain a good amount of humus, or vegetable mold. Such soil is usually found in river basins, the beds of old lakes, and occasionally on the lower slopes in hilly regions. The plant requires a medium amount of rainfall, and the great wheat-growing regions are those that have from twenty to forty inches of rain annually, about thirty inches securing the best results, provided the rain falls so as to supply the crop with water during the growing season. The plant should also secure its growth during cool weather either in early spring or late fall. Wherever these conditions of soil, rainfall and temperature exist, wheat can be successfully grown. These conditions are so varied over the wide range in which the plant is cultivated that a great many varieties have been produced, but these can all be grouped under two classes, winter wheat and spring wheat.



Winter Wheat Winter wheat is so called because it is sown in the autumn and remains in the ground until the next season. The time for sowing ranges from early in September to late in October, according to the locality and climatic conditions. In the warm portions of the wheat regions it is sown earlier than in the cooler portions. Winter wheat gets a good start in the fall months and matures in June or early in July of the following season. It is well suited to those localities that have a dry hot summer, as the conditions of climate necessary to its successful growth and maturity are met by sowing in the fall. Winter wheat is generally sown in the warm portions of the wheat belt, both in the United States and other countries. It yields well, and makes a good grade of flour.

Spring Wheat Spring wheat matures in less time than winter wheat, and can be sown in the spring and harvested in the following July or August, except in the coolest portions of the spring wheat belt, where it does not reach maturity until the first of September. It is sown as early in the spring as the ground can be worked, and attains most of its growth during the hottest part of the season, maturing during the later summer months. There are numerous varieties of spring wheat, such as the red and the white, and the small berry and the large berry. In general, it furnishes a harder berry than winter wheat, and makes a flour of better quality. This wheat is adapted to the cool temperate regions, and can be grown successfully as far north as Hudson's Bay.

THE WHEAT COUNTRIES The great wheat countries of the world are the United States, Russia, Argentina, France and Germany. Austria, India and Egypt also produce considerable quantities. Of all these countries, Russia and India are the only ones that raise enough for their own consumption, and both of these export small quantities. The opening of

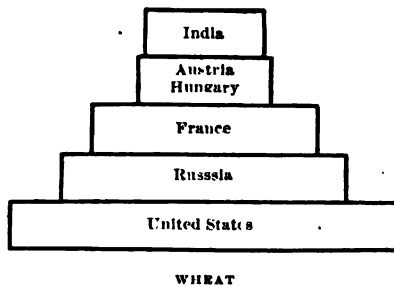


HARVESTING WHEAT IN NORTH DAKOTA

Siberia will, in the near future, undoubtedly increase the Russian wheat fields, and consequently that country's production.

THE UNITED STATES

Wheat culture in the United States began with the earliest colonization. This cereal early became the staple of the New England and Southern colonists, and it was successfully grown by the French in the Mississippi valley many years before the war which gave that region to the English. Wheat culture in this country has always



followed the tide of immigration, until now the grain is raised in forty-three states and territories. In twenty-five of these winter wheat is grown, and in nineteen spring wheat, while some produce both varieties. The conditions favorable to the production of wheat in the United States are found in the entire basin of

the Red River of the North; the upper portion of the Mississippi basin as far south as the Des Moines River in Iowa, the Illinois River in Illinois, the flood plains of the Arkansas, and rivers of Kansas and Oklahoma; in Indiana as far south as the Wabash; all along the Lake Erie slope of Ohio and New York, and in the Columbian Plateau and Sacramento basin on the Pacific coast.

The Spring Wheat Belt

The basin of the Red River, and that portion of the Mississippi basin as far south as the Des Moines, constitute the spring wheat region. Here the winter is long, the spring late and the summer short. Wheat planted in the spring has opportunity to attain its growth before the hotter weather sets in. The period in which it ripens is usually free from ruin, which assures the gradual maturing that secures the excellent grade of wheat for which the region is noted.

The Red River Basin The most important wheat region of the United States and of the world is in the basin of the Red River of the North. Here are found those extensive wheat farms containing from 25,000 to 30,000 acres or more, and here is raised the best quality of spring wheat.



WHEAT HEADER AND THRASHER

These farms are divided into sections, each of which has its group of buildings, teams and farm machinery, and is in charge of a foreman. The ground is plowed with sulky plows which turn two or more furrows at a time. The motor power is usually horses or mules. Attempts have been made to use traction engines, but these are not generally satisfactory. The plowing is done in the fall, and the seed is sown as early in the spring as the thawing of the ground will permit. This work is done by seeders which plant the seed and cover it at the same time. Harvesting

takes place from the middle of August to the tenth of September, according to locality. The grain is cut and bound by self-binding harvesters. As harvesting must be accomplished within a short time after the grain is ripe, and a harvester can harvest only about ten acres a day, each farm requires a number of these machines. Many of these harvesters carry the sheaves until a number are collected, when they are dropped. Workmen follow the binders and stand the bundles in groups called stooks, or shocks, so that they will dry as soon as possible. In some sections the wheat is stacked before thrashing, but in most cases it goes directly from the stook to the thrasher.

As soon as the wheat is dry, it is thrashed. This work is done by steam thrashers which clean the grain, and with but little assistance stack the straw. The machines are driven by twelve-horse power engines, and will thrash from 1200 to 1500 bushels in a day. As the grain comes from the thrasher it is hauled to the granaries, or if sold, to the nearest elevator.

Instead of marketing his wheat at the time of thrashing, a farmer may hold it until late in the season. If the price is good, it is to his advantage to market it at once. In either case it is shipped from the local elevator to some of the large wheat centers. The most important of these are Minneapolis, Duluth, Chicago and Buffalo. In these cities are found elevators capable of containing from 500,000 to 1,000,000 bushels of grain each. These are used for storing the wheat until it goes to the mills. Some of these large elevators are made of wood, but the later patterns are of steel, tile, or concrete, and are in the shape of huge tanks. (See Frontispiece.) The elevators contain the most ingenious labor-saving devices for the handling of the grain; the labor expended upon it being confined to operating the machinery.

This is well illustrated by an elevator at West Superior, Wis.

This building is 230 feet high, and 135 feet wide, and is built entirely of steel. It cost over two million dollars, and will contain more than three million bushels of wheat. The machinery is such that with the labor of a few men, 600 cars of grain can be unloaded in a day. This means the handling of 400,000 bushels. As the wheat leaves the car, it is dropped into the basement where it is caught up by a series of buckets on an endless chain and carried to the top of the building, and put into bins which hold from 7500 to 15,000 bushels. Before being placed in the bins the wheat is weighed so that the exact amount is known. From the bins it is loaded directly into boats for shipment to Buffalo.

The Winter Wheat Belt This includes that portion of Iowa south of the Des Moines River, and the wheat growing portion of Kansas, Nebraska, Oklahoma, Indiana, Illinois and Ohio. The climatic conditions here are quite different from those in the spring wheat belt. The summers are long and hot, and the winters mild. If wheat were planted in the spring, it would grow during the hot weather of June and July, and the plant would produce a large quantity of straw and very little grain and that of poor quality. Many of the wheat farms of Kansas are large, and in some years that state has even led North Dakota and Minnesota in her production of wheat. Each of the other states also produce several million bushels. In Illinois and Indiana the farms are smaller, and in Ohio the cultivation is on small farms, largely on the plan of intensive farming, which secures a large yield per acre. Considerable wheat is also grown in western New York on the same plan.

The Pacific States On account of the peculiar climatic conditions of California, Oregon and Washington, this region furnishes a grade of wheat of high quality, but somewhat different from that grown in other portions of the country. Most of this is winter wheat, but on account of the

dryness of the climate the berry becomes nearly as hard as that of some spring varieties. The harvesting here is somewhat different from that in the valley of the Red River of the North. The grain becomes thoroughly dry before cutting, and in many places the harvester used cuts only enough of the straw to secure all the heads. The thrasher is attached to the harvester, so that the harvesting and thrashing are done at the same time and by the same piece of machinery. One of these machines requires from twenty to twenty-four horses to operate it successfully. The grain from this region is all sacked before shipping, and this has given rise to a thriving industry in the manufacture of gunny sacks. Most of this wheat is ground in the states where it is grown, and the flour is exported to China and Japan.

Transportation Wheat is transported by rail and by water. With the exception of that on the Pacific coast, it is carried in bulk, being run directly from the elevators into the car or ship, as the case may be. The average freight car will contain 675 bushels, and the task of moving a large crop taxes the railways to their utmost capacity. Transportation by water is much cheaper than by rail, consequently, much of the wheat destined for European markets is shipped to Duluth or Chicago, and thence by water to Buffalo where it can be reloaded into canal boats and carried to New York via the Erie Canal and Hudson River. Many of the steamships on the Great Lakes can carry cargoes of more than 250,000 bushels.

FLOUR The wheat berry, or the kernel, as it is commonly called, has a somewhat complex structure. If a kernel is carefully split through the middle, and the exposed surface examined by a powerful microscope, we find that the inside of the berry is filled with white granules of almost pure starch. Surrounding this is a coating which has a yellowish tint. This coating is nearly all gluten, the most nourishing and valuable part



THE PILLSBURY A
The Largest Flouring Mill in the World. Capacity 14,000 Barrels a Day

of the berry. Outside of the gluten is a covering of bran. This is arranged in five coats, each differing from the other in structure and appearance, but all are made up of wood fiber, wholly worthless as an article of food. At the one end of the berry, and within the bran coats, we find the germ, which must be separated from the other parts in order to obtain flour of the best quality.



GRINDING ROOM IN A FLOUR MILL.

Milling The milling of wheat has for its purpose the crushing of the berry and converting the starch and gluten into flour. When the wheat enters the mill, it is first cleaned, during which process all imperfect kernels and seeds of other plants are removed. The dust is then removed by running the wheat through a series of rapidly revolving brushes, through which is passed a blast of air. In some of the best mills the wheat is

steamed a short time before grinding. This prevents the bran from breaking into such small particles that, when ground, it cannot be separated from the other parts of the berry.



PACKING ROOM IN A LARGE FLOUR MILL

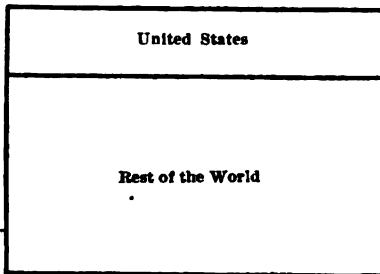
The wheat is ground by passing through series of steel rollers, those in each set being closer together than in the one preceding. After being thoroughly ground in this manner, it passes through the separators which remove the bran and the germ. Several grindings and siftings still follow before the flour is perfected. It is then exposed to a blast of air to cool it, when it is ready to be

packed for shipment. Flour is packed in barrels and sacks. A barrel of flour weighs 196 pounds; the sacks are of half-barrel, quarter-barrel, and eighth-barrel sizes. It usually requires four and a half bushels of wheat to make a barrel of flour.

The large milling centers are naturally near or at the large shipping centers, but we find small mills located all over the wheat belt. To these mills many farmers sell their wheat, and from them flour is sent, not only to supply the local trade, but to many distant cities and states, and sometimes to foreign countries. The capacity of these small mills ranges all the way from 100 to 1000

barrels a day. Minneapolis is the greatest milling center of the world. In this city are found single mills capable of producing 15,000 or more barrels of flour in 24 hours, and the full capacity of this milling center is nearly 50,000 barrels a day.

The United States is the leading wheat-producing country of the world. It now



raises one-fifth of the world's supply, and the tendency is to increase rather than to diminish this output. Our position as a wheat country is due, not only to the vast extent of our wheat lands, but to the ingenuity of American inventors in producing, and the intelligence of the American farmers in using, our agricultural machinery, without which the cultivation of the great farms would be an impossibility. The only other country that approaches the United States in this respect is Canada, where we find the same thrift, energy, and intelligence as in the United States. Our annual production of wheat is about 720,000,000

bushels. We export annually about 155,000,000 bushels, and about 18,000,000 barrels of flour. The leading countries in this trade are the United Kingdom, Germany, British North America, Africa and France; while the largest purchasers of flour are the United Kingdom, Holland, China, Cuba and the West Indies. Small quantities also go to Brazil, Japan and Africa. The average consumption of wheat in the United States is about four and a half bushels for each individual, and it requires about two square feet of land to raise enough wheat to make a loaf of bread weighing a pound.

QUESTIONS.

What are cereals? Why are they so called?

Between what parallels of latitude are the great wheat countries of the world situated?

Is wheat raised in your vicinity? If so, is it spring or winter wheat?

What inventions have contributed to make the United States the greatest wheat-producing country in the world?

Why is wheat such a valuable article of food?

Make a list of all the uses of wheat?

CHAPTER III.

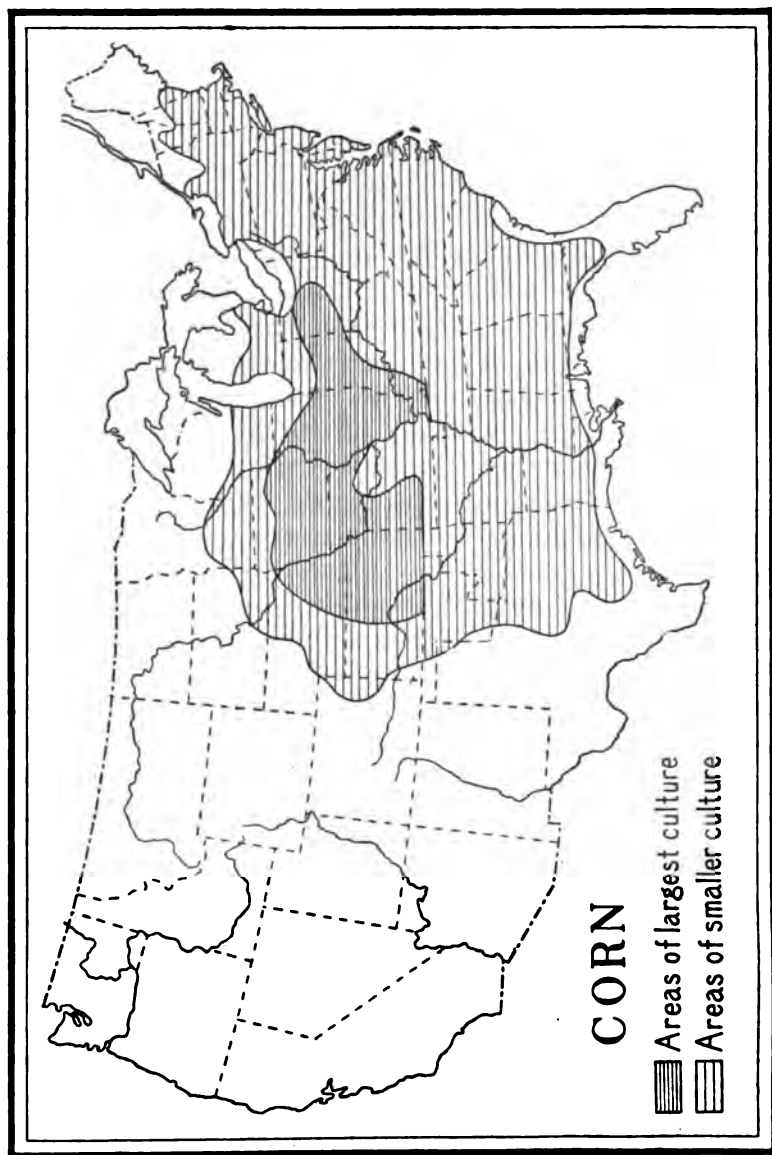
CORN.

In its broadest meaning the word corn applies to all cereal grains. The Scotch call oats corn; to the Englishman an ear of corn signifies a head of wheat; while in some of the countries of Northern Europe, rice and corn mean the same thing. But in the United States the word means Indian corn, or maize.

HISTORY Corn is the cereal of the New World. When America was discovered, the natives were found using various preparations of this grain, and it was from this beginning that the use of corn was extended until it has reached its present limit.

Corn was originally a semi-tropical plant, but the rude method of cultivation by the Indians extended its area as far north as New York and the New England States, and now by far the greatest quantity is raised in the temperate regions of the Old and New Worlds. Besides the United States, we find the countries of Southern Europe and India now raising considerable quantities of corn, and its cultivation is yearly being introduced into other countries.

THE CORN PLANT Corn is a tender plant, and at any period of its growth it is easily damaged by frosts. The seed cannot be planted until the season is sufficiently far advanced to allow the growing corn to escape late frosts, and the region in which it is grown must have a late warm autumn, almost without rainfall, otherwise the grain will not ripen. Corn thrives best on a rich loam, and most of it is raised on a heavy clay loam composed of finely ground rock from which the plant



food has not been washed. The plant produces most abundantly where the rainfall is from thirty to forty inches, falling mainly in spring and winter. It thrives much better on dry land than on that which is wet or abundantly moist. Since the plant absorbs a large quantity of moisture from the atmosphere, it often thrives in localities where the rainfall is not sufficient for the best results in raising wheat, oats and other small grain.

There are many varieties of corn, each of which seems to be suited to a definite purpose, and some are especially adapted to certain localities. The small, hard, yellow corn will mature in a shorter season than some of the larger varieties, and can be successfully grown in New England, and the northern parts of Wisconsin, Minnesota and the Dakotas. Sweet corn is raised for eating green and for canning, while popcorn is considered something of a luxury and is not raised in large quantities, although the crop when successful is more profitable than almost any other that the farmer can produce. When we speak of corn without any qualification of the term, the large dent corn is meant. The quantity of this variety raised in the United States exceeds many times that of all others combined.

THE CORN BELT

Corn is grown in nearly all of the states east of the Great Plains, and in many of them a sufficiently large yield is secured to make the crop a profitable one; but in only a few does the raising of corn constitute the chief industry. These states form what is known as the corn belt, and are Iowa, Missouri, Kansas, Nebraska, Illinois, Indiana and Ohio. Within their boundary is produced nearly nine-tenths of all the corn grown in the United States, and within this region we find the conditions essential to the most successful cultivation of this grain. It will be noticed that a number of these states also belong to the wheat belt.

The wheat is grown mainly along the flood plains of the rivers

and in old lake bottoms where the soil is of the fine silt variety required by that grain. The corn occupies most of the land in this belt which is higher and drier. Therefore, except in Kansas, the wheat production in these states is very small compared with the corn crop.

Tillage We do not find in the corn belt any such large farms as the bonanza farms of the wheat region. In the eastern states, the farms are small, seldom exceeding 240 acres. But as one goes westward, he finds the average size to increase until in Western Iowa, Nebraska and Kansas, 400 or more acres may be included in a farm. There are a few exceptions to this rule, where a syndicate, or some enterprising farmer, has purchased a number of farms and operates them all under one management. Much that has been said about the treatment of land in the raising of wheat applies also to the raising of corn. The land is plowed and prepared for the seed in about the same way for both grains. Corn, however, is planted in rows so that the hills are equally far apart each way. One looking at a field of growing corn early in the season, notices that the rows run both ways and at right angles to each other, and that they are about three feet apart. When the corn is small this seems to be a waste of ground, but by the middle of the season the plants have become so large that the leaves of one hill touch those of the next.

The seed is usually planted from the first to the middle of May, according to locality. The work is done by a planter drawn by horses, and so gauged that it drops the seed and covers it at equal intervals of space. Guiding his machine by a wire stretched across the field, a careful operator will succeed in planting his field so regularly that the rows will be straight in each direction. The young plants are very tender, and when they have attained the height of five or six inches tillage begins. In order to keep the soil loose and moist about the roots, and to keep down the

weeds, the ground must be cultivated every week or two until the plants become so large that the cultivator can not be drawn between the rows without injuring the crop. The field is then laid by for the corn to fill and ripen. In respect to tillage corn presents a marked contrast to wheat which covers the ground so thickly that cultivation is unnecessary.

This necessity for cultivating the land makes corn a more expensive crop to raise than wheat. In good soil the most thrifty plants attain a height of from sixteen to eighteen feet, but the average height is from seven to eight feet. Each stalk bears several ears. The yield varies from thirty or forty to as high as eighty bushels per acre, though the latter result is seldom attained. The crop is usually harvested about the middle of September, or may remain standing longer if conditions make it necessary.

Harvesting Formerly the harvesting was all done by hand. Only the ears were collected from the stalks which were left standing, but now the corn harvester does the work in a manner quite similar to that of the self-binder employed in harvesting wheat. The bundles of corn are stacked in shocks for drying. Husking is commenced at the earliest possible date. Numerous machines have been invented for doing this work, but until recently they have not proved satisfactory, and most of the husking is still done by hand. This task is of such magnitude that it often engages the entire population for several weeks. After husking, the ears of corn are stored in cribs, which are large sheds having their sides made of narrow strips of board with wide openings between them, so as to permit a free circulation of air. The corn remains in the cribs until it is thoroughly dry, when it is ready for use.

USES While not as valuable as wheat, taken bulk for bulk, corn is more widely used because it is more suitable for so many different purposes. Corn is very wholesome and nutritious, and it is estimated that it is used as a food by a larger

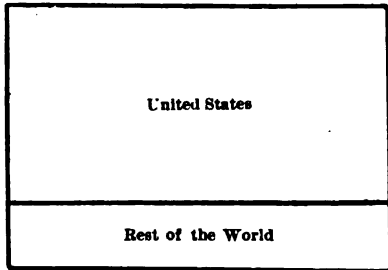
number of people than any other cereal except rice. Its most extensive use, however, is for fattening stock, and we find that the states in which the corn belt is located supply our markets with a large number of hogs and cattle. In many cases where corn is fed to stock, it is not husked.

Corn is shelled or thrashed by machines driven by steam-power. The largest of these will thrash from 2500 to 4000 bushels in a day. It is only the shelled corn that is shipped from the regions in which it is grown. This constitutes about one-fourth of the crop, the other three-fourths being used for purposes already stated.

When ground, corn produces a flour commonly known as corn meal, from which numerous articles of food are prepared. Another very extensive use of corn is in the manufacture of starch. Nearly all the starch used is produced from this grain, and there are factories in Oswego, N. Y., and on Long Island, which manufacture more than 20,000,000 pounds each year. Another useful production from this grain is glucose, or corn syrup, in the manufacture of which 50,000,000 or 60,000,000 bushels are used yearly. There are large glucose factories in Buffalo, N. Y., Shadyside, N. J., and Peoria, Ill. Glucose is extensively used in canning fruits, for diluting syrups, making candy, and in the manufacture of numerous culinary preparations. It is much less expensive than any grade of syrup that can be produced in the manufacture of sugar, consequently it replaces that article wherever its use will not injure the product. An equally large amount of corn is also used each year in the manufacture of whiskey and other alcoholic spirits. The most extensive industry of this sort is located in the cities of Peoria and Pekin, Illinois.

In addition to many uses, for which the grain itself is valuable, we find numerous uses for other parts of the plant. The stalks are nutritious and form a valuable fodder for cattle, either

after they become dry or when they are green. In fact, the green corn in the form of fodder constitutes the principal feed for cows in many of the dairy districts of the country. For fodder, the corn is planted late in the season, and the crop is harvested while the stalks are green and tender. These are usually cut into small pieces and packed into air-tight compartments, called silos, from which the feed is taken as needed during the winter. The pith is used in the manufacture of smokeless powder and for pack-



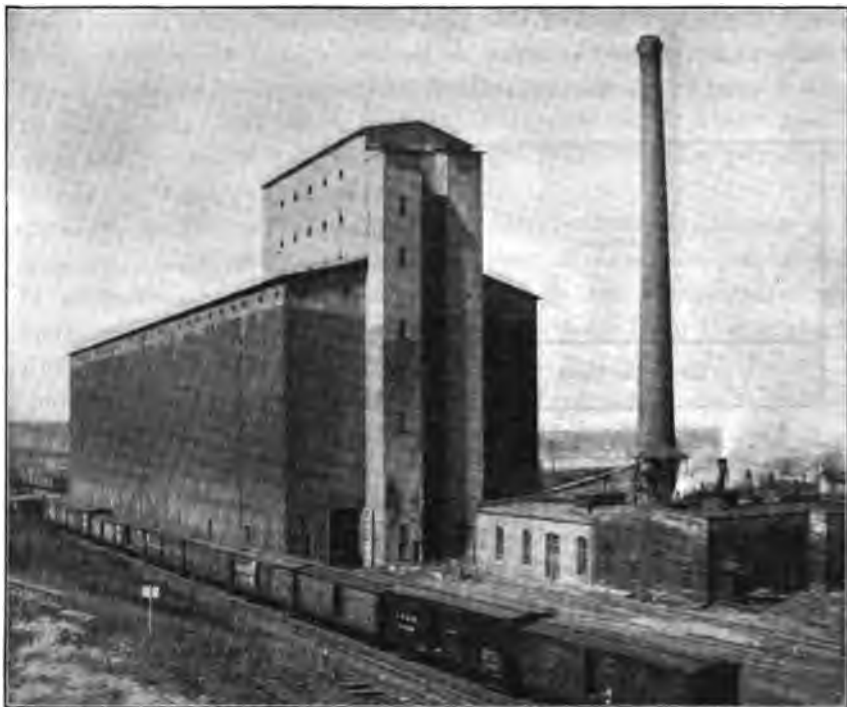
CORN

ing under the armorplate of warships. When wet, the fiber swells rapidly, and in case of injury to the ship, it prevents leaking. The husks are employed in the manufacture of mattresses and for making some kinds of paper. In the fruit regions they are also extensively used in packing fruit; and, lastly, in those portions

of the corn belt, where fuel is scarce, the cobs are very generally used for this purpose, thus leaving no part of the plant to go to waste.

PRODUCTION The United States is the largest corn-producing country, raising four-fifths of the world's crop, and the growing of corn supports a larger number of people than any other industry in the land. The annual crop amounts to about 2,200,000,000 bushels, and has an average value of over \$700,000,000. This exceeds the value of the wheat and cotton crops combined, which are our two next largest agricultural products. Thus we see that corn growing is our most important, as well as our most valuable, industry. The successful raising of this grain has given the states in the corn belt most of their wealth

and also led to the establishment, within their borders, of many of the great industries now found there. The farmers of the corn belt are invariably prosperous, and most of them have acquired considerable fortunes by their industry. The people of foreign



AN OLD STYLE ELEVATOR

countries have not yet learned the value of corn to any great extent, and in order to market the vast crop raised in the country, the farmers have to convert a good part of it into beef and pork.

The methods described for the marketing and transportation of wheat also apply to corn and need no further description.

**OTHER
CEREALS**

The other cereals forming important crops in the United States are rice, oats, barley, rye and buckwheat. Rice is grown in the South. It requires a warm climate and low ground that can be flooded after planting. It constitutes one of the most valuable food plants in the world, and its culture is rapidly increasing in Louisiana. Oats grow farther north than corn or winter wheat, but thrive well in regions where spring wheat is raised. Barley has about the same range as wheat, and is extensively used in the manufacture of malt liquors. Buckwheat grows rapidly and matures early. It is valuable for fattening hogs, and the flour made from it is an important article of food.

QUESTIONS.

Of what use was corn to the Indians before they became acquainted with the white men?

How did the corn which the Indians raised compare in quality and quantity with that now raised in the best portions of the corn belt? How can you account for the difference?

Which is the more productive plant, wheat or corn? Which is the more useful?

Why is wheat so much more extensively used in Europe than corn?

Name the most important purposes for which corn is used.

What other cereals besides wheat and corn constitute important crops in the United States?



A STOCK FARM

CHAPTER IV.

LIVE STOCK.

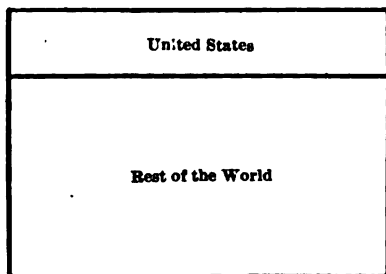
The raising of live stock is a valuable and important industry, and extends over nearly the entire agricultural portion of the country. Cattle are raised for beef and dairy products, horses for draft and driving, sheep for wool and mutton and swine for pork. The important part of this industry naturally centers in those regions where conditions are especially adapted to its success.

The principal grazing regions are found in the western portion of the Great Plains, including most of Montana, east of the mountains, portions of Wyoming, Nebraska, Indian Territory, Oklahoma and Texas. The region is semi-arid, having only sufficient rainfall to produce a good growth of grass. The climate is temperate, and remarkably well suited to stock raising. Late in the summer the grass dries and may be harvested and stacked like hay in other regions, or left standing for the stock to feed upon during the winter, as they feed upon the green grass in spring and summer. The grazing region is in marked contrast to the rich agricultural region to the east, and to which many of the cattle are sent for fattening before being marketed.

DAIRYING Dairying is successful only in those regions where good crops of alfalfa corn and grass can be grown, since the cows must have plenty of sweet, juicy feed in order to produce an abundance of milk of good quality. The best dairy conditions are found in the northern states bordering on the Mississippi. Of these Iowa takes the lead, producing a larger quantity of dairy products than any other state in the Union. Iowa is followed by Wisconsin, Minnesota and Illinois. Good dairy farms

are also found in the central part of Nebraska and Kansas, and in the northern portion of Indiana, in Ohio and New York. In the northern New England States dairy husbandry has replaced the general farming that formerly characterized the agriculture of that region. The United States contains about 18,000,000 milch cows, and makes about 1,400,000,000 pounds of butter, and 300,000,000 pounds of cheese a year.

Most of the butter and cheese marketed is made in factories. The butter factories are usually known as creameries. Each



CATTLE

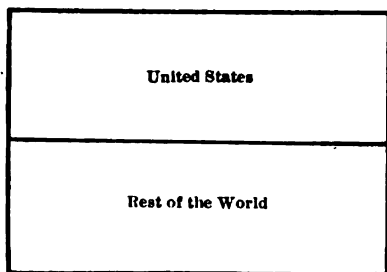
creamery receives the milk from the cows of quite a large region, and makes butter on a large scale. The cream is separated from the milk by a machine called the cream separator. The separator revolves at a very high speed, and since the cream is lighter than the milk, it is brought to the top and flows out through a tube,

while the milk flows from a similar tube below. When in operation, a stream of milk flows into the separator, and streams of cream and skimmed milk flow out. Cheese factories also receive the milk from surrounding dairies, and operate on a large scale. Nevertheless, fully one half of the butter and cheese made in the country is made on small farms and wholly by hand labor. Most of this is consumed where it is made.

Jerseys, Holsteins and Ayrshires are the best breeds of cattle for dairy purposes, since their cows yield an abundance of milk of good quality, and the steers are easily fattened for beef. But while these steers make excellent beef, they are small and not as profitable for marketing as those of the larger breeds.

The total value of the dairy products is about \$500,000,000, which is somewhat greater than the value of the wheat crop. About one-third of this is exported to European countries.

BEEF Dairying and raising cattle for market are two distinct branches of the live-stock industry, and the dairy states are not noted for their production of beef. As already stated, we find most of the cattle raised for beef grown on the ranches bordering on the eastern slope of the Rocky Mountains; Montana, Wyoming, Colorado and Texas being especially noted for their extensive grazing territory. The

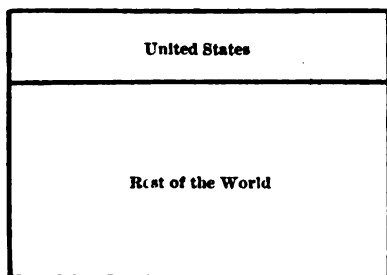


HOGS

The Shorthorns or Durhams are the best breed for beef. They are large, fatten easily and slaughter with but little waste. But the Herefords are common on the large ranches because they are good travelers and somewhat more hardy than the Shorthorns.

The cattle are pastured on the ranches until they are three years old. Those that become sufficiently fat during the season of that year are shipped in the fall directly to the meat-packing centers. By far the greater part of our beef comes from these sources, but there are left on the ranches each year large numbers of steers that are not in condition for market. Many of these are purchased by farmers in the corn belt, who call them feeders. During the winter they are fed on hay and corn, then for a short time in the spring they are pastured on good grass, when they are ready for market. These cattle supply us with beef during the spring and summer months, and are an excellent source of profit to the farmers who raise corn.

PORK The raising of swine is another important branch of the live stock industry. The United States contains over 65,000,000 of hogs, valued at \$240,000,000. They are raised most successfully where the grain upon which they are fattened



WOOL

is the most cheaply produced, consequently we find the largest number of hogs in the corn region. The Berkshires, Poland-China and Jersey Reds or Durocs are the most successful large breeds. The best animals from any of these breeds weigh from 500 to 600 pounds at the end of eighteen months. The Victorias, Essex and Suffolks

are the most common small varieties. They mature early but seldom exceed 300 pounds.

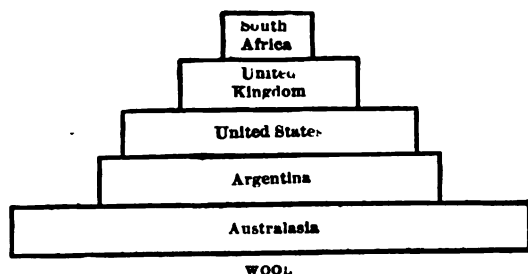
MUTTON AND WOOL

Sheep raising is profitable in dry, mountainous regions, where grazing is good, and we find these conditions among the foot-hills bordering the Great Plains, and in numerous valleys of the Rocky Mountains. Portions of Montana, Wyoming and New Mexico have extensive sheep ranches. Others are found in the southern half of California, while east of the Mississippi, Ohio is the only state in which large numbers of sheep are raised. There are usually about 62,000,000 head in the country, and more than half of these are in seven states which are wholly, or in part, within the grazing region of the Great Plains and the Rocky Mountains. Montana has the largest number, and Wyoming comes next.

Sheep are valuable for wool and mutton, but sheep-growing regions are ranked in accordance with the amount of wool they produce. Wherever we find conditions similar to those described

above, we find wool-growing countries. Besides the United States, the semi-arid regions in Australia, New Zealand, the plains and foothills in Argentina, and Orange River and Transvaal Colonies in South Africa, produce large quantities of wool and mutton.

Wool fiber is composed of small scales overlapping like the scales of a fish. The ease with which these move upon each other



makes wool and woolen goods very soft. It also causes the thread to shorten when wet, so that great care has to be taken when washing woollen fabrics to keep them from shrinking.

Sheep are graded in accordance with the quality of wool they produce, coarse-wooled, medium-wooled, and fine-wooled. Cotswolds and Leicesters are the best coarse-wooled breeds; Southdowns the best medium grades, and the Merinos the best fine-wooled sheep. Southdowns are the best for mutton, and Merinos are the poorest. Large numbers of sheep are slaughtered each year for meat.

The annual wool crop of the United States amounts to a little over 277,000,000 pounds, which is about one-eighth of the world's product. In addition to this about 100,000,000 pounds are imported. The woollen manufactories are mostly in the New England and Eastern States.

MARKETING The great meat-packing centers are located at Chicago, Omaha, Kansas City, St. Joseph, Fort. Worth, Cincinnati, Sioux City and New York. Cattle are transported to these centers in stock cars constructed especially for the purpose. The cars are provided with troughs for feed and water,

and the trains are run so as to cover the distance in the shortest possible time. At each one of these centers are stockyards, into which the animals are unloaded immediately upon their arrival. Here they are sold to the packing-houses, and for export.

Slaughtering and Packing The large slaughtering houses and rendering establishments are situated in the midst of the stockyards, and animals destined for slaughter are driven up an inclined viaduct to the top of the building where they are killed. As the carcass of the animal passes from one process to another in the course of its preparation, it descends until finally the dressed sides are sent to the cold storage rooms on the ground floor.

The system and despatch attending the work of slaughtering and meat packing are seldom equalled in any other line of industry. In some of the great packing-houses of Chicago, cattle are killed at the rate of eight a minute, which makes 4,000 in a day. Within forty-five minutes from the time the animal is killed, the dressed sides of beef are hanging in the cold storage room, and they have passed through the hands of 150 workmen during the process of preparation. Hogs are killed at about the same rate, though the time required for dressing is much less. A single workman kills hogs at the rate of four a minute, and within twelve minutes after the pig is stuck his dressed sides are in the cooling room.

Excepting a very small quantity which is sold as fresh meat, the pork is prepared for use before shipping. This preparation consists in making it into sausage, bacon, salt pork and pickled hams. Most of the beef is shipped in sides or quarters, which are transported in refrigerator cars. When exported to foreign countries, it is loaded from the cars into refrigerator ships so that it reaches its destination in as good a condition as though it had been killed at the market where it is offered for sale.

In no industry is greater care taken to prevent waste. Every

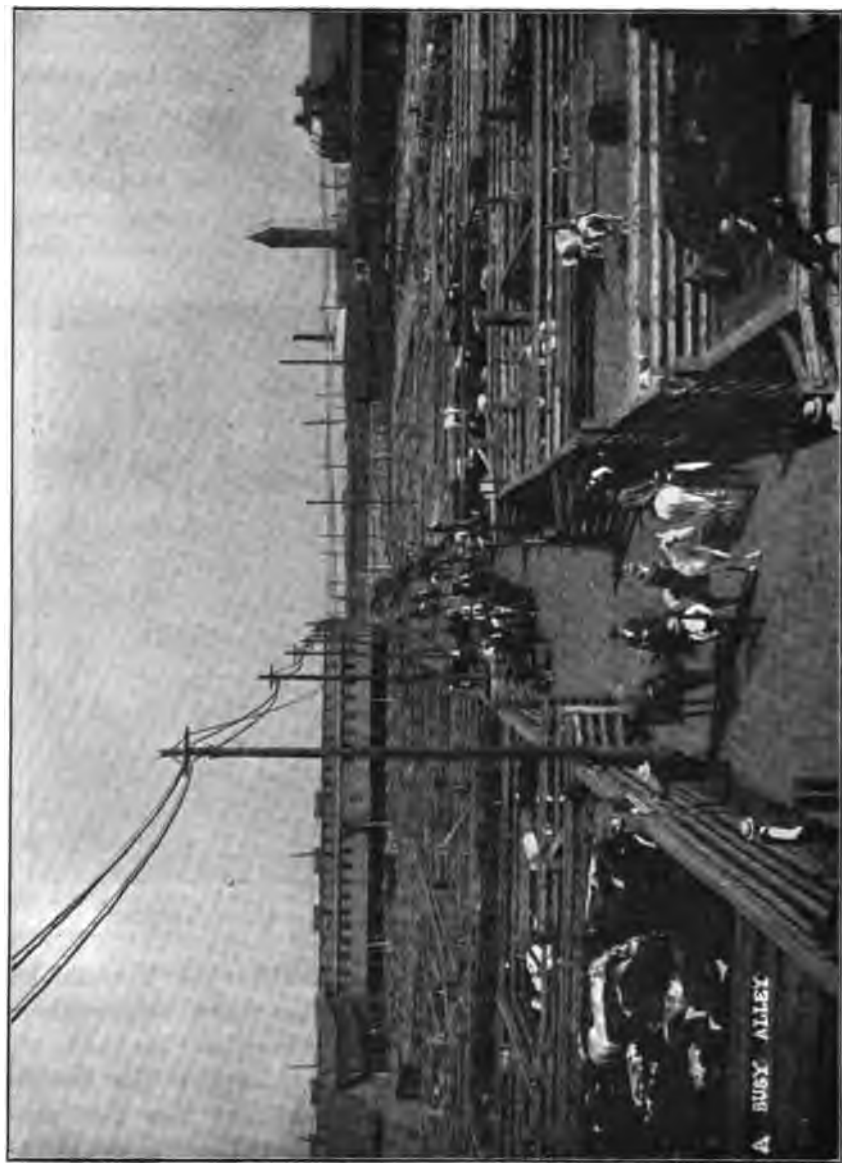
part of the animal is worked up into some useful product, which can be exchanged for value. The most important of these by-products are hides and leather, lard, tallow, glue, soap and fertilizer. The horns and hoofs are made into combs and buttons, the bristles into brushes, and the hair into felt. The revenue derived from these sources is nearly sufficient to pay the expense of main-



BEEF IN A COLD STORAGE ROOM IN A LARGE PACKING HOUSE

taining the rendering establishments, and without this it would be impossible to place the beef, pork and mutton which they produce upon the market at the prices for which these articles are sold.

VALUE The United States produces one-third of the world's supply of meat, which is much more than that produced by any other country. This output requires the slaughter-



A BUSY ALLEY

UNION STOCK YARDS, CHICAGO

ing of 5,500,000 cattle, 9,000,000 sheep, and over 30,000,000 hogs, each year. Chicago is the largest meat-packing center in the world, and produces over forty per cent of the output of the country. The increase in the population of the Pacific States has led to the establishment of a few meat-packing centers in that region, and their tendency is to increase in size and importance.

We export annually about half a million cattle, and 150,000,000 pounds of beef, besides large quantities of pork. England is our best customer, followed by Germany and France.

QUESTIONS.

What states lead in raising cattle? In raising sheep? Why?

How are great cities supplied with fresh milk?

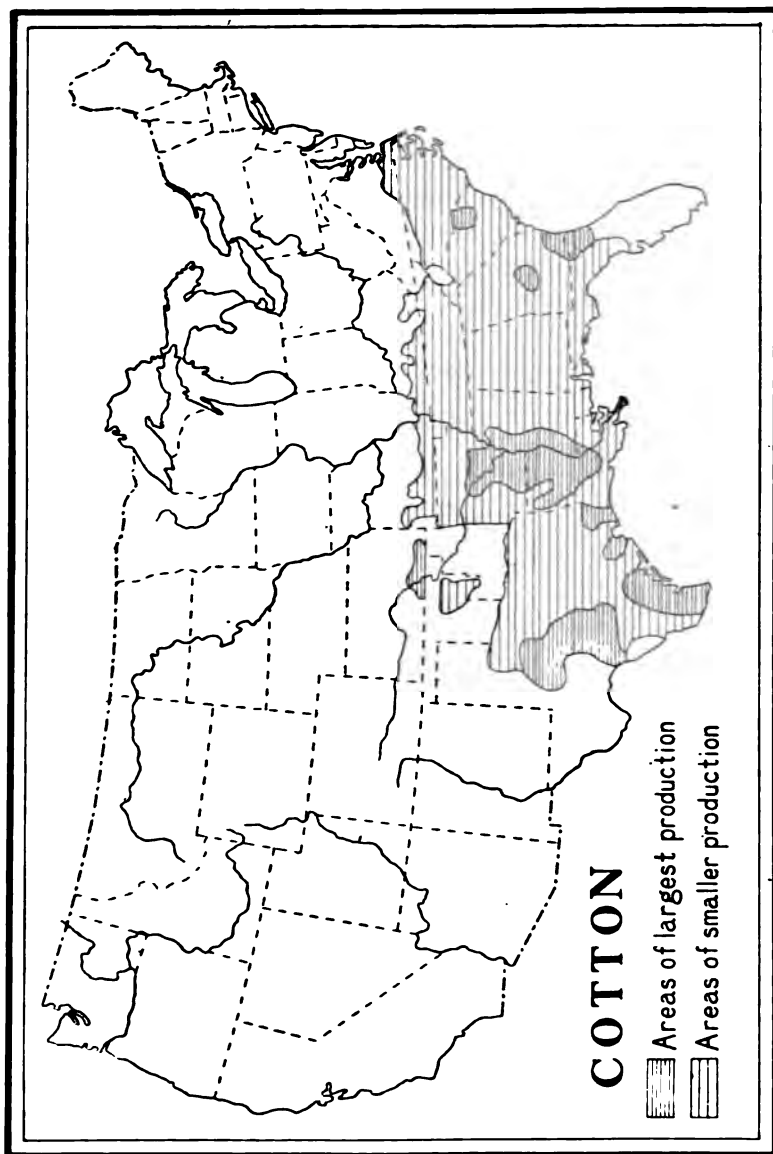
What localities supply our markets with the largest number of beef cattle? With the largest number of hogs? What is the reason for this?

For what purposes are sheep valuable?

Why are the meat-packing establishments located where they are?

What are the most important by-products of the packing houses?

How is dressed meat shipped to distant cities? To foreign ports?



CHAPTER V.

COTTON.

HISTORY So far as we know, the fiber of the cotton plant was first used for making clothing in India. In records obtained from that country, bearing the date of 1000 B. C., we read that the people were clothed with a fine white cloth, which certainly means that they had garments made from cotton. Historians also generally believe that the ancient Egyptians cultivated cotton, and used the fiber in the manufacture of cloth, though no evidences of this industry have been found in their tombs or temples. Some of the early Roman writers refer to cotton as "tree wool," and they undoubtedly obtained this idea from the cotton tree of India. Cotton was introduced into China and Japan at a very early date, but it was not cultivated in these countries for general use until about the beginning of the fourteenth century. When the Mohammedans took possession of Northern Africa they extended the cultivation of cotton to this part of the world; and later, when they made the conquest of Southern Europe, they introduced the industry into the countries of the Mediterranean.

In America The cotton plant is a native of the New World. When Columbus landed on the West Indies, he found the plant growing there, and later the Spaniards found it in use in Mexico and Peru, where the natives had acquired considerable skill in the manufacture of cotton fabrics.

The first attempt to raise cotton in the American colonies was made in Virginia in 1621, but it was more than 175 years before the industry became at all important. During this period its growth was very gradual. By 1660, cotton was raised to a very

limited extent in both North and South Carolina. It was from these beginnings in Virginia and the Carolinas that its cultivation gradually spread to the other colonies whose climatic conditions were such as to make its culture successful. Previous to the Revolutionary War small quantities of cotton were raised in all the Southern colonies, and some was exported to England.

England was then, as she is now, the leading country in the manufacture of cotton goods, and the inventions of the spinning-jenny and the power-loom, and the modification of the steam engine, so that it would furnish power for operating these machines, enabled England to manufacture a much larger quantity of cotton goods than ever before. When the American colonies had obtained their independence, there was a greater demand for cotton by the English manufacturers than the world was able to supply. This was not so much because a sufficient quantity of cotton could not be raised, as it was on account of the labor required to separate the fiber from the seed.

At this time the invention of the cotton-gin by Eli Whitney, an American, removed this great obstacle to the cotton industry. By the use of this machine, one man in a few hours could separate more cotton from the seed than a hundred men could in working by hand for the entire day. Probably no other invention has ever produced a more marked effect upon the industry and history of a country, than did the cotton-gin upon the United States. As soon as the raising of cotton was made profitable, large plantations sprang up all through the Southern States, and it was from the product of these plantations that the market of England was supplied.

THE COTTON PLANT

The cotton plant belongs to the mallow family, and is closely allied to the marsh mallow and the hollyhock. Originally it was a tropical plant, but its cultivation has now been extended to the fortieth parallel

of latitude on each side of the equator. However, it will not thrive where the mean annual temperature is not over sixty degrees. The cotton plant grows best in a sandy loam containing large amounts of lime and phosphate. The soil of the Southern States is composed largely of disintegrated limestone that contained these



NEGRO CABIN IN A COTTON FIELD

substances, therefore it is especially suited to growing the plant. Cotton needs a rainfall of not less than forty inches, and so distributed as to leave a gradually drying season in which to mature.

There are many varieties of cotton, but those grown in the United States are the short staple, which is the plant having a short fiber, and the long staple, more generally known as the "sea

island," which has a long fiber. This variety was so named because its cultivation was begun on the islands along the coast of South Carolina and Georgia, where most of the long staple is still produced. The fiber is about two inches in length and very fine and strong, making this the most valuable cotton grown. The short staple is by far the most extensive crop, and it is this variety that fixes the market quotations. Because it is raised farther inland, it is generally known as the "upland cotton."

The cotton plant is one of unusual beauty. The "upland" variety attains a height of about two feet, while the "sea island" plants are from eight to ten feet high. The leaves are dark green with blue veins. The plant has a showy white flower which resembles a single hollyhock. The fruit, in which the seed matures, is a round pod called the boll. When the seed is ripe the bolls burst and the white fiber appears. The useful part of the plant is the fine fiber or wool which surrounds the seed.

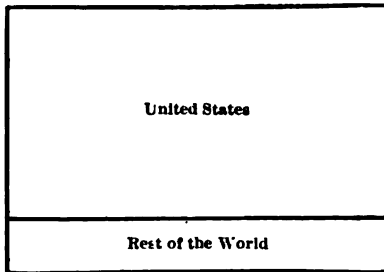
THE COTTON BELT

What is known as the cotton belt of the United States includes Mississippi, Georgia, Texas, Alabama, Arkansas, Louisiana, South Carolina, North Carolina and Tennessee. Cotton is also raised in Missouri, Virginia, Kentucky, Oklahoma and Indian Territory. In all of these states the agricultural conditions are such as to make the cultivation of cotton successful and profitable. In most of them, previous to the Civil War, the cotton was grown on large plantations owned by slaveholders, most of whom had become very wealthy. The war destroyed many of these plantations, and most of the cotton is raised on small farms, and in the Southern States the work is done almost entirely by the colored people.

Cultivation The seed is sown the last of March or early in April. During the first part of their growth the plants must be carefully tended and kept free from weeds. The bolls begin to ripen about the first of September. As the bolls

burst they must be picked or the cotton is injured or wasted. Nearly all the work of the fields is performed by hand labor.

Harvesting Several machines for picking cotton have been invented, but none has proved very satisfactory, since during the early part of the harvest the plants contain both the ripened and the growing bolls. As the bolls have to be picked as fast as they burst, the pickers are obliged to go over the field again and again, until the last bolls have ripened. No machine has yet been invented which will pick the ripened bolls and leave



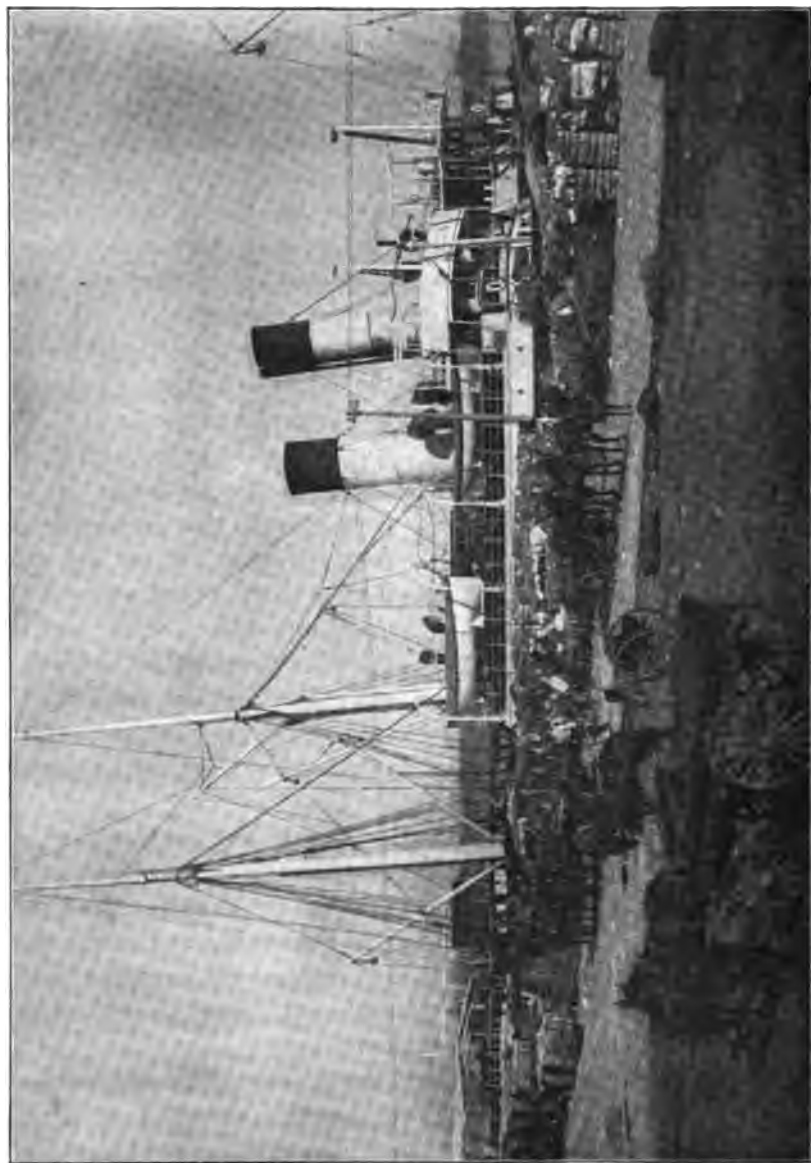
COTTON

the others, consequently cotton must be picked by hand. As soon as picked, the cotton is hauled to the gin-house where it is ginned, that is, separated from the seed. From the gin it goes to the press, where it is made into bails. Each bail is intended to weigh 500 pounds, and the average weight is

about 480 pounds. Presses for bailing cotton are very powerful, and in order that the bail may retain its form it is strongly hooped before the press is released.

Marketing The bails are usually sent to the nearest market towns, where brokers buy the cotton on commission for the agents of the large cotton mills, or for export. That for export is sent to the seaports, and from September to January the wharfs of those cities from which it is shipped are crowded with bails of cotton. Galveston, New Orleans, Savannah and New York are the principal ports of shipment.

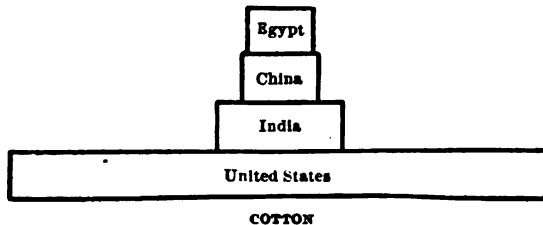
Liverpool and Manchester are the greatest European cotton markets, and buy fully one-half the quantity exported from the United States. Bremen, Trieste and Genoa are also good markets.



SHIPPING COTTON

About one-third of the crop is consumed in the United States. The mills in which this is manufactured are in the New England and some of the Southern States.

VALUE Of the four great staples—cotton, wool, flax and silk—that supply man with clothing, cotton, on account of its cheapness and its many excellent qualities, is much more extensively used than any of the others. Cotton leads all farm crops in cheapness and ease of production, it makes scarcely any drain on the soil, and it is grown and harvested with the expenditure of less labor than most other crops. While the greatest value is in the fiber, the seed is a source of considerable profit. Cotton seed is valuable for the manufacture of oil, and after the extraction of the oil it makes an excellent feed for cattle and a valuable fertilizer as well. The stalk also contains a fiber that will be valuable as soon as a machine for extracting it is invented, while from the root a useful drug is obtained.



The United States produces three-fourths of the cotton raised in the world, the annual crop being about 11,000,000 bales. The value of the crop is next to that of wheat, which it sometimes equals; but cotton is considered the best cash crop of the American agriculturist.

The importance of the American cotton crop to the countries of Europe can scarcely be estimated. During the Civil War little or no cotton was exported and the operatives in the English cotton mills were brought to the verge of extreme poverty by being

thrown out of work for most of the time that the war was in progress. Besides, the supply of cotton goods fell so far short of the demand, both in the United States and Europe, that the price of the common grades was more than five times what it is to-day, thus placing these goods almost beyond the reach of the poorer classes who relied upon them for much of their clothing.

Flax and silk are not produced in the United States in sufficient quantity to warrant their consideration in connection with the other textile fibers.

QUESTIONS.

From what part of the plant is the cotton fiber obtained? The fiber of flax?

Why is more cotton raised in the Southern States than in any other part of the world?

What inventions have aided in the development of the cotton industry?

Why is England the leading country in the manufacture of cotton goods?

For what other purposes than the manufacture of cloth is cotton used?

CHAPTER VI.

FISHERIES.

Fish have always constituted an important article of food. Long before men had learned to domesticate animals they relied upon fish as a means of sustenance, and to this day savage and partially civilized nations make fish one of the chief articles of diet; and among civilized people the taking and curing of fish has for centuries constituted a profitable employment, often being the means of adding largely to a country's prosperity.

FISHING GROUNDS

Food fish are found in both salt and fresh waters, though the salt water fish far exceed in quantity and value those found in fresh water. The best varieties of food fish inhabit cold water. Wherever shoals are found in the colder waters of the sea, or wherever on land we find mountain streams fed by melting snows, or clear lakes whose sources are cold springs, we find the home of the best fish. Good fishing grounds are found near the coast and in the inland waters of all the northern countries. Those belonging to the United States are naturally divided into three divisions: The Atlantic, the Pacific and the Inland.

The Atlantic Division

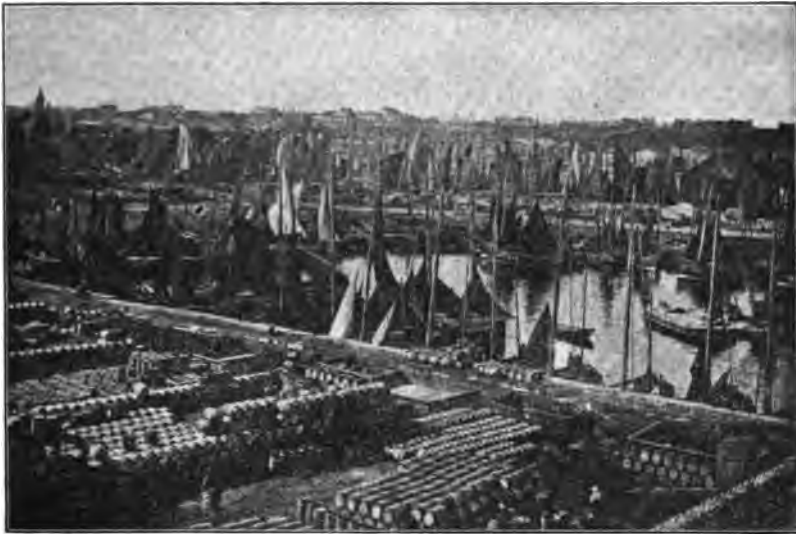
The fishing grounds of North America in the Atlantic Ocean extend from Cape Hatteras northward as far as Newfoundland, and are the most important on the Grand Banks lying east of Nova Scotia, Newfoundland, and adjacent islands. A portion of these grounds belong to Canada, while the remainder is situated in the high seas. In the southern portion of the Atlantic division, the fish are caught comparatively near the shore, and this section is less important

than the northern. The most important fish taken in these waters are the cod, herring, mackerel, haddock, halibut, shad and menhaden.

The valuable fisheries around the Grand Banks were discovered by the early explorers of this part of North America, and within a few years the waters were frequented by both the English and French fishermen. In fact, it was the advantage offered by these fisheries which first induced the French to make settlements so far north. During the early part of American history these waters were fished by both the French and English, without regard to territory; but after the United States became independent, the law regarding coast waters was applied to the fisheries. By the terms of this law, each nation reserves to its own fishermen the exclusive right to the waters within three miles of the shore. Beyond that limit, the fisheries are open to all on equal terms.

Cod are the most important fish taken in these waters, both in point of number and in value. They are caught with hook and line. The fishermen go out in small boats called schooners. Each schooner has two or more small boats, or dories, attached. When the schooner reaches the banks, it anchors, and the fishermen proceed to put out their trawls. These are long lines, to which are attached at frequent intervals shorter lines bearing hooks. A good sized schooner will put out several miles of trawl, containing from 10,000 to 15,000 hooks. After the trawls have been set, the fishermen go along the lines in their dories, continuing to haul in the fish that have been fastened to the hooks. When brought to the schooner, the fish are immediately dressed, split open, and most of them salted. The livers are saved, because from them is taken cod liver oil, a valuable medicine. When the schooner obtains its load of fish it returns to port, and prepares the fish for market. Most cod are put upon the market dry salted. They are dried by being spread upon rocks or platforms, where they are

exposed to the air and sun. Shredded or boneless cod is made by removing the bones from the fish and cutting the flesh into small strips. These are placed upon the market in small packages or boxes, weighing from one to five pounds. Gloucester, Massachusetts, is the most important fishing port on the Atlantic coast, and is the center of the cod-fishing industry; but nearly all the towns



A FISHING PORT IN HERRING SEASON

on the coasts of Maine, New Hampshire and Massachusetts are engaged to a greater or less extent in fishing.

Haddock, which closely resemble cod, are taken near the shore, and are extensively used in towns along the coast. They are usually dry-salted and are placed on the market as finnan haddie.

Herring and mackerel are caught in nets. These fish travel in large numbers, called schools, and when a school is encountered,

a boat load is quickly obtained. By some authorities, the herring is considered the most important food fish in the world, though it is not as extensively used in the United States as in Europe. Herring and mackerel frequent the shore waters of Maine and New Hampshire, and are taken in these localities in large numbers. Herring appear on the market in three forms; fresh, salted and smoked. Small herring are canned in oil and sold as sardines; but the real sardine, obtained from the Mediterranean, is an entirely different fish. The American sardine industry, although new, is rapidly growing in importance. Mackerel are usually pickled in brine, but large quantities are placed on the market fresh.

The halibut is a very large fish, often weighing from one hundred to three hundred pounds, and it is caught by hook and line. Halibut is usually placed on the market without salting, and is considered one of our best salt-water fishes.

Shad are taken in large numbers, at certain seasons of the year, when they ascend the mouths of rivers to spawn. This fish inhabits warmer waters than the cod and herring, and is found at the mouths of all rivers as far south as the Delaware. The shad is a fish of excellent flavor, and is highly prized.

Menhaden are not important as a food fish, but are taken in large quantities because they are valuable for their oil, and the refuse, after the oil is extracted, forms an important ingredient of commercial fertilizers.

The salmon of the Atlantic coast is one of the most valuable food fishes in the world, and is taken at the mouths of rivers for a short season each year. The salmon fisheries of the Atlantic Division do not rank in magnitude with those of the Pacific; but the industry is of sufficient importance to warrant attention, though most of the product comes from the British provinces. Nearly all of the Atlantic salmon are smoked before placing them on the market.

Pacific Division The coast waters of the Pacific contain about the same species of fish as those of the Atlantic, but only the salmon fisheries have been developed. These are located at the mouth of the Columbia River and around Kadiak Island, Alaska, where we find the largest salmon fisheries in the world. The fish are caught in nets and traps, and by wheels which are so constructed as to throw them from the water when they crowd together in the streams. The fish are dressed, packed in cans and cooked by steam which is raised to a high temperature. The cans are then sealed and labelled, after which they are ready for market. The quantity of salmon taken from these waters each year is about 125,000,000 pounds, and has a value of over \$8,000,000. The output is exported to nearly all countries in the world.

The Inland Division This division includes the Great Lakes, the rivers and many small lakes whose waters abound in fish. The important fish of the Great Lakes are the white fish, the lake trout and the sturgeon. White fish and lake trout are taken by nets and weirs or traps. Sturgeon are usually taken in weirs, but may be caught with a hook. The sturgeon is the largest fresh water fish, often weighing one hundred pounds or more. The eggs are used in the manufacture of caviare, and the flesh is highly esteemed.

Most of the lake fish are placed on the market fresh. When caught, they are dressed, packed in ice and immediately shipped to their destination. The fisheries of the Great Lakes exceed those of all the other waters of the country. The most valuable river fish are the buffalo, and the cat-fish of the Mississippi Valley. Bass, pickerel and perch are found in the small lakes and streams, but constitute an inconsiderable item, when compared in value with the fish taken from the sources named.

Until recently, fish could not be shipped any distance and

reach the market in good condition ; but the application of refrigeration to this traffic now enables almost any market to be supplied with fresh fish, in as good a state of preservation as when taken from the water. This has tended to increase the demand, and the fisheries of the United States are constantly growing in value and extent.



CATCHING WHITEFISH, LAKE SUPERIOR

GOVERNMENT CONTROL

For many years fish were taken with so little care and forethought, that finally the best species became nearly extinct. The government now has oversight of the fisheries in all waters under its control, and through the United States fish commission makes

rules prohibiting the taking of fish at certain seasons of the year, and also prescribing methods of fishing. The commission maintains fish hatcheries at various localities, where millions of fish are hatched every year. These, or eggs, are transported from the hatcheries in specially constructed cars, and placed in the waters of lakes and rivers, wherever they are most needed. In addition to the United States fish commission, nearly every state now has its own commission and maintains its own hatcheries. Most states have already passed stringent laws regarding the catching of fish. By these means, the supply of fish is not only maintained, but in some localities it is even on the increase.

While the value of the fish trade does not compare with some other lines of industry, yet the use of fish has become so extensive, that this industry has established an important line of commerce, though scarcely any of the fish taken in the United States are exported.

QUESTIONS.

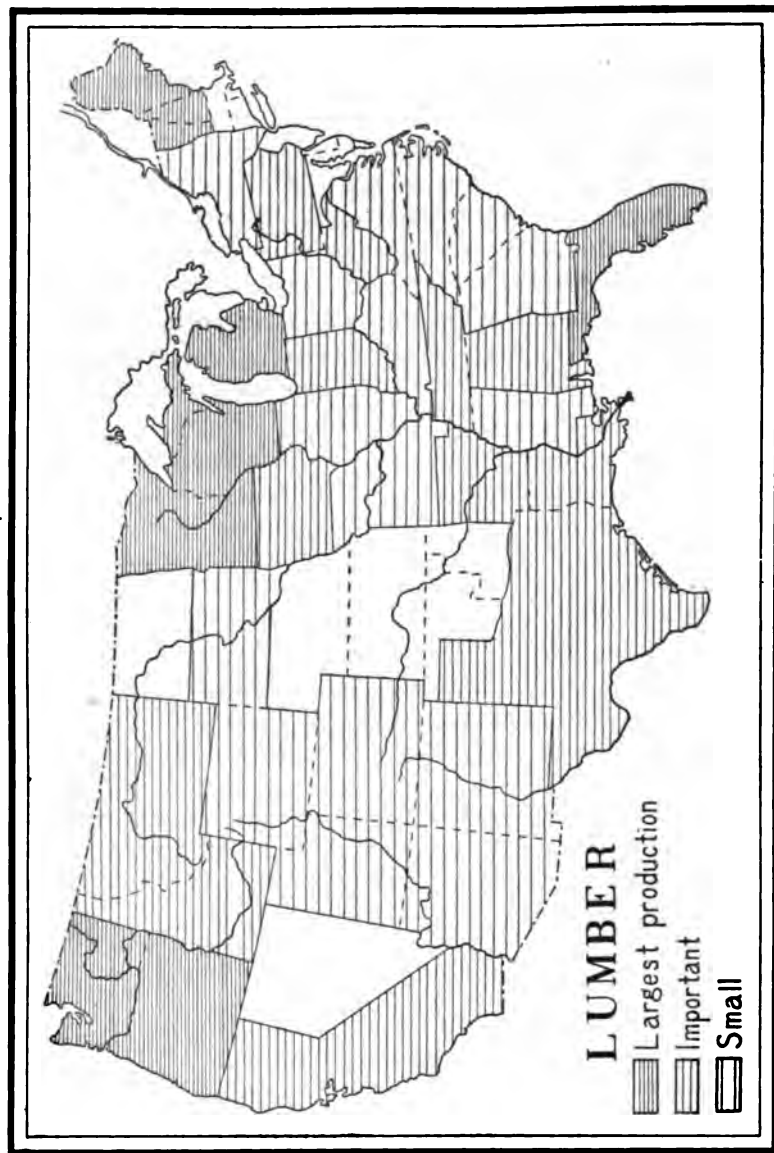
What influence did the fisheries around the Grand Banks have upon the early history of North America?

What salt-water fish do you find in your market? Which variety is the most valuable?

What are the most valuable food fish found in the Great Lakes? Where are the most valuable fishing grounds in these lakes?

Where are the great salmon fisheries? How are salmon preserved for the market?

Are there any valuable fishing grounds in tropical waters? If so, locate them.



CHAPTER VII.

FOREST PRODUCTS.

FOREST REGIONS

Forests are usually found in regions having sandy and loamy soils, and an abundant rainfall. They are seldom found where the rainfall is less than thirty inches and in the United States the most dense forests occur in regions having over fifty inches. Mountains within these regions are usually forest clad to their summits, unless, as in the Rocky and Sierra Nevadas, the altitude extends above the tree line.

The forest regions of the United States are located in the eastern and western portions of the country, and are separated by a vast treeless plain. The eastern region coincides with the Appalachian Highlands, and extends from Maine to Georgia and Alabama. The portion of this region, south of the Ohio and Missouri, extends westward across the Mississippi, so that the southern portion of Missouri, all of Arkansas, a good part of Mississippi, Louisiana and Alabama are quite heavily timbered. A lighter growth also extends northward into Southeastern Iowa, and westward to include a portion of Kansas, Indian Territory, a portion of Oklahoma, and the eastern third of Texas, as far south as the thirtieth parallel. Pine, oak and cypress are the prevailing trees in the southern portion of this region.

The northern portion of the Appalachian region contains white pine, spruce, hemlock, balsam and many varieties of hardwood, such as maple, birch and beech. The timber is heaviest in Northern Maine, Northern Vermont and New Hampshire, and in the Adirondack region in New York. Passing southward the forest is most dense in Western Pennsylvania and along the moun-

tains through Virginia, West Virginia, North Carolina and Eastern Kentucky and Tennessee, and extending into the northern part of Georgia and Alabama. An abundance of pitch pine is found in this locality, and furnishes the source from which most of our turpentine, resin and tar are obtained. Lighter growths on the eastern slope descend to the coastal plain throughout the entire region, and on the western slope they extend across Ohio, the southern half of Indiana, the entire portion of Kentucky, and the southern part of Illinois.

Around the Great Lakes there are extensive forests of white pine in the northern parts of Michigan and Wisconsin, and the northeastern part of Minnesota. These forests have furnished the great lumber regions of the country for the last quarter of a century, and in many localities have been almost entirely destroyed. South and west, the growth extends across all of Michigan, about half of Wisconsin and half of Minnesota. While white pine is the most common tree in this region, spruce, balsam, oak, hemlock and other species are found.

The forest regions of the Rocky Mountain Highlands extend southward along two lines. The first follows the eastern range of the Rocky Mountains into New Mexico. In the north this region covers the northern portion of Idaho, the western third of Montana, and the northwestern portion of Wyoming. South of this point it is much narrower, and is quite closely confined to the mountain range. The timber is mostly pine. The trees are tall, straight and of small diameter.

The coast division extends from the northern boundary southward into the northern part of California where it divides into two branches. The eastern, which is quite narrow, follows the Sierras as far as the thirty-fifth parallel, and the western follows the coast almost to the Golden Gate. The northern portion includes Washington, west of the Columbia River, and the western third

of Oregon. Here is the most dense forest in the United States. Here are found the Oregon pine, sugar pine and the redwood. The trees in this forest are much larger than those around the Great Lakes and along the Appalachian Highlands, and extensive lumbering interests are now located in this portion of Washington and Oregon.

USE OF FORESTS

The greatest use of forests is for lumber, and some kinds of trees are more valuable for this purpose than others. These are divided into hard wood and soft wood. The most valuable of the soft wood trees, in their order, are white pine, yellow or pitch pine, spruce and hemlock, in the Atlantic division; and the red cedar or redwood, and Oregon pine, in the Pacific division. Of the hard woods, oak, hickory, maple, poplar and ash are the most extensively used. Soft woods are more generally used for making the frames and finishing interiors of buildings, while hard woods are used for finishing interiors, the manufacture of furniture, the framework of carriages and machinery, and for many small articles in common use.

White pine is the most valuable timber tree of the temperate regions, and is more extensively used than any other. This tree is found in large quantities from Maine to the Mississippi River, and its abundance in Michigan, Wisconsin and Minnesota has given rise to the large lumber industry now carried on in those states. These same states also have a thriving business in hard wood lumber.

Pitch pine, or yellow pine, is found in the southern part of the Appalachian Highland region, and is cut quite extensively in North Carolina and Georgia and is known in the market as Georgia pine. The cypress, another soft wood tree, is also used to some extent in the Southern States.

The forests of the Pacific States differ from those of the



A GROVE OF REDWOODS, OREGON

Atlantic States by having much larger trees, and a much more dense growth. The abundant moisture of this region causes the redwood and the Oregon pine to grow to a gigantic size. Trees measuring four or six feet in diameter are of common occurrence in these forests, while the large ones often attain a diameter of sixteen feet or more, and are nearly four hundred feet in height.

In order to be suitable for lumber, the trees must have a straight trunk, and be clear—that is, free from branches or knots for at least fifteen feet from the ground. In the dense forests, the branches will not grow except near the top on account of the shade; therefore, nearly all trees used for lumber are cut from the interior of the woods. Those of the best quality are taken first and worked up into the lumber used in building and cabinet making. Small trees, and those unsuitable for lumber, are often cut into ties and sold to the railway companies, while still others are used in the manufacture of wood pulp. When the forest supplies the timber for these three purposes, it is usually entirely cut away.

Lumbering The first step in lumbering is to select a site and establish a camp, which is to be the home of the lumbermen during the season. The buildings of this camp are usually constructed of logs, and consist of houses for the men, a kitchen and dining-room, barns and a blacksmith shop. The camp is located at a point most convenient for the work, and the men composing the crew are as thoroughly organized as an army. They are formed into squads, each in charge of a leader, and designated to one particular kind of work. Some fell the trees, others cut them into logs, while others with horses haul the logs to the place from which they are loaded on sleds or cars. The entire camp is in charge of a foreman whose duty it is to select the trees to be cut, and have general oversight of all the work. An average sized camp contains from forty to fifty men.

Transportation Transportation of lumber is very expensive, and the profits of the industry often depend very largely upon the economy that can be practised in getting the logs to the mill, and the lumber from the mill to the market. Whenever possible, the logs are hauled on sleds to a stream, into which they are rolled when the ice breaks in the spring. They are then floated down the river to the mills. When transported in this way, the lumbermen at the end of the season, change their occupation, and become rivermen, following the logs and guiding them on their course.

Naturally the first lumbering in any section of the country is near bodies of water on which the logs can be transported. As the trees near these streams are cut away, and the work goes farther and farther from them, the expense of hauling the logs to the river becomes so great that in many places steam sawmills are built in the forests, and logs are worked up near where they are cut. In other localities railways are built into the logging regions, and logs are taken to the mill by train. The logs from the lumber regions near the Great Lakes are often freighted by water. Several hundred thousand feet of lumber can in this way be built into a raft, which is towed to its destination by a steamer. Logs are often sent from Oregon and Washington to San Francisco in a similar manner. This is the cheapest method of transportation. Except felling the trees and cutting the logs, the work in Oregon and Washington is done entirely by machinery. The logs are so large that they cannot be moved by teams, and the smaller trees are cut into great lengths for masts.

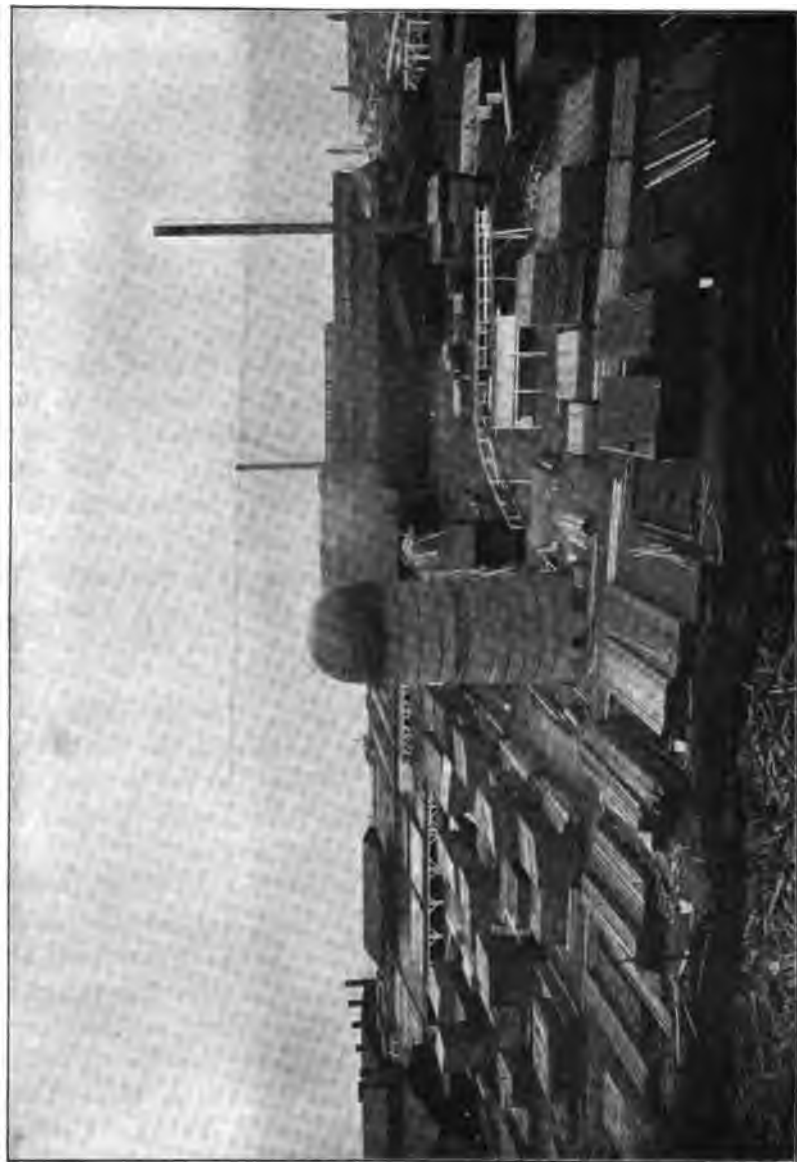
Sawmills The mills in which the logs are made into lumber are known as sawmills. These mills are located as near the lumber regions as possible, and often form centers around which thriving towns spring up, like Cheboygan and Menominee, Michigan. These mills are driven by water or steam power,

and contain such machinery as is necessary to make the various kinds of lumber for which the timber of the region is adapted. Nearly all the logs are sawed into boards or joists. Some logs of the best quality are made into clapboards, and others into shingles, while the slabs and boards of very poor quality are made into lath.

Logs are cut into lumber by circular saws, which are large steel discs with teeth on the edge; band-saws, which are bands of steel extended over large pulleys and having teeth on one edge; and gang-saws. The gang consists of a number of saws, from ten to twenty-four, arranged in a steel frame and as far apart as the desired thickness of the boards. These saws have an up and down motion, and as the log slowly passes through them it is cut into boards. All of the work is done by machinery, and from the time the log enters the mill until the lumber reaches the yard where it is stacked for drying, it is scarcely touched by a workman. If hardwood is used, the logs may be sawed into parts of furniture, or may be cut by lathes into very thin boards, such as are used in veneering and in the manufacture of fruit baskets.

As already stated, all of the log is used. The slabs and poor boards are worked into lath, and, in a steam-mill, the waste and sawdust are used for fuel to drive the engine. At every point the greatest economy is practised, and this is necessary in order to receive a reasonable income from the capital invested.

Marketing Some of the lumber is worked up in the towns where the sawmills are located, and only the manufactured product is shipped. Grand Rapids and Minneapolis are noted centers of such manufacture and contain large furniture factories, and factories for making doors, sash, casings, and finishings for the interior of buildings. Large receiving centers are found at convenient points, Chicago, St. Louis and Cairo, Illinois, are important lumber markets in the Mississippi Valley. Chicago

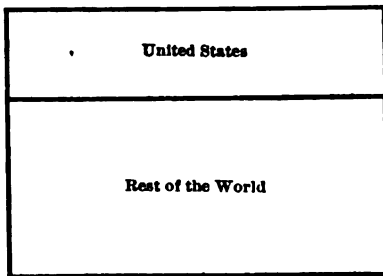


THE LARGEST LUMBER MILL ON THE PACIFIC COAST

receives a large part of the output from Michigan and Wisconsin, since it can be shipped by boat at a great saving of expense. It is cheaper to manufacture the lumber at these receiving centers, and ship the product, and we find in them also factories for making furniture, and all other articles made from lumber. Chicago and Grand Rapids are the largest furniture manufacturing centers in the country, and Chicago is the largest lumber market in the world.

Uses The uses of wood are so extensive and numerous, that it would be impossible to name them all. More people live in houses built of wood than in those built of brick and stone. Wood is used as a fuel more extensively than coal. In some form

or other it touches our daily life on every hand. Besides forming the framework and finishings of our dwellings and places of business, from it are made those small articles which are indispensable, yet so common that we do not realize their importance until deprived of their use. In the form of wood pulp, it constitutes a



LUMBER

good portion of all the paper now manufactured, and as papier-maché, it becomes the material from which are made tubs, pails, and numerous other domestic utensils.

Lumbering ranks fourth among the great industries of the country. The annual output is valued at about \$570,000,000, and the industry gives employment to 390,000 men. The amount of lumber consumed for all purposes in the course of a year, is equal to about 200,000,000,000 board feet.

**OTHER
PRODUCTS**

Besides wood and lumber, our forests yield us several other products of importance. From the pitch pine of the South we get tar, turpentine and resin. The tar is a thick, black liquid, which is obtained by partially distilling the pitch pine. It is used for caulking the seams on ships, covering roofs to make them water-tight, and in the manufacture of some kinds of rope. Coal tar is now extensively used for these purposes, so that the demand for pitch tar has been greatly lessened.

Turpentine is procured by distilling the sap of the pine. It is used in the manufacture of varnish and in the preparation of paint. Resin is the residue obtained after the turpentine has been driven off by distillation. It is used in the manufacture of laundry soap, as a reducing agent in soldering, in making varnish and for some other minor purposes.

The bark of the hemlock and the oak is extensively used in tanning leather.

**VALUE OF
FORESTS**

However valuable forests may be as the source of lumber and other products, they are of still greater value on account of their place in the economy of nature. Forests are the great conservators of moisture, and their influence upon the water supply of the country is much more extended than we often think. The ultimate sources of all important streams are in heavily timbered regions. The great areas of rootage and leafage formed by these forests are the principal agents in regulating and increasing the amount of moisture in the atmosphere.

. The roots of trees are constantly drawing water from the soil, which, after it circulates through the plant, is given off by the leaves in the form of vapor. At first thought it would seem that the amount of moisture thus given to the atmosphere would be extremely small, but the best authorities tell us that a

medium-sized elm contains about 7,000,000 leaves which present to the air a surface of about five acres, and that these leaves will give off about seven and three-quarters tons of water in twelve hours of clear, dry weather. When we multiply this by hundreds and thousands to represent the trees in a large forest we soon discover that the amount of water thus discharged into the atmosphere is beyond our comprehension.

The soil of the forest has been made porous by the numerous roots that permeate it, so that it absorbs the water from heavy rainfalls or melting snows, and easily retains it, allowing it to flow out gradually through the springs and small streams. When an area has been denuded of its forest trees, instead of absorbing the water from the heavy rainfalls, the soil allows it to run off, and we find that streams flowing from these regions suddenly become flooded and often do great damage.

The greatest dangers to our forests are from their ruthless destruction by those who are engaged in the lumber industry, and from forest fires which destroy thousands of acres every year. It is only within a few years that the Government has realized the importance of preserving the forests around the sources of our great rivers, and has taken such measures as will prevent their destruction. The Department of Agriculture now has a Bureau of Forestry. The duties of this bureau are to prevent the cutting of timber from government lands, to prevent forest fires, and to instruct those, who so desire, in the care of forests and the growth of trees. Some of our leading colleges, also, now give courses in forestry, and our public schools observe Arbor Day throughout the country, the purpose being to interest the pupils in the planting and growth of trees. In the western half of the United States forest reserves have now been established around the head waters of the Mississippi, Missouri, Yellowstone and some other important rivers. Some of these, as in the case of Yellowstone Park

and Yosemite, have also been made national parks. The United States is gradually assuming that care of her forests, which for many years has been exercised by the Germans over the forests of their country, and if this is continued there is no reason why trees should not grow as fast as they are used, and our forests be maintained for years to come.

QUESTIONS.

How many different trees can you recognize? Name them.

Why are forests more generally found in mountainous regions than on plains?

What benefits do forests confer upon the country besides furnishing lumber and fuel?

What measures does the government take to protect forests?

Where are the great lumber markets located? Why?

Why is white pine so extensively used for lumber? Name some of the uses for which hard-wood lumber is employed.

CHAPTER VIII.

MINERAL INDUSTRIES.

Buried beneath its surface, the earth contains untold treasures. Some, like precious stones, are valuable because they are rare and beautiful; others, such as gold and silver, because of their peculiar relation to commerce and industries; while still others, such as iron, copper and coal, because their general usefulness has given them important economic relations. These common minerals are so closely associated with all lines of industry that they have become indispensable.

MINING Mining is the occupation of extracting minerals from the earth, and sometimes the process of separating metals from their ores is so closely associated with it, that both operations are considered together. This is particularly true of those mines having smelting works near at hand, and whose ores contain a number of metals, such as gold, silver and copper.

Location of Mines Minerals are most abundant in the mountainous regions, and, as already noted, we find the important mining states to be those of the Appalachian and Rocky Mountain Highland regions. To this we must make one noted exception. The great coal-producing states of Ohio, Indiana and Illinois are located in the prairie region, and their coal measures seem to lie as they were first formed, without having undergone any change of position by such movements of the earth's crust as formed the great mountain ranges.

Methods All mining is prosecuted in very much the same way. When the material to be obtained is deep in the ground, shafts are sunk, and, from the foot of these, galleries are



THE DOUBLE HOIST AT THE BUTTE MINES, MONTANA

excavated. The galleries follow the vein of mineral and are often very irregular and winding. The surrounding rock is kept from caving in by timbers which are put in place as the excavation proceeds. The ore is hoisted to the surface by elevators, operated by hoisting engines, or it is taken out by tram cars. Every mine is provided with ventilating shafts and with pumps for carrying off the water that is constantly running down.

In many mines among the Rocky Mountains and in the coal regions of Pennsylvania shafts are sunk to a great depth, and several galleries, called levels, are excavated, one above the other, the ore from all being brought to the surface from the same shaft. The aim, in all cases, is to secure the mineral with the least possible expense consistent with safety to the miners.

When the ore, or metal, occurs on the surface, as in case of gold in the sand and gravel on the beach or along the bed of a stream, mining is a very simple process. The gravel is shovelled into a pan, or sluice, and washed. The gold is heavier than the pebbles and sinks to the bottom more quickly. When the washing is in a sluiceway, slats are nailed across the bottom of the sluice every few feet. The water is turned on and the gravel shovelled in at the upper end. As the gold sinks, the slats keep it from running down the sluice, and, when the water is shut off, it is picked out. The great iron mines around the upper end of Lake Superior are also surface mines. But these are described on page 123.

Mining Towns Towns usually spring up around the mines. They comprise the dwellings of the miners and officers, a few stores, possibly one or two banks and hotels, and one or more places of amusement, with other public buildings. Most of these towns are of a temporary nature, and disappear when the mine becomes exhausted, and the miners remove to another locality. For this reason the buildings are usually plain

board structures of the simplest sort. They may be comfortable and reasonably convenient, but they are not ornamental.

IMPORTANCE The mining industry is closely related to transportation and manufactures. The carrying of ore, coal and stone constitutes the larger part of the business of those lines of railway which traverse the mining regions, and the product of the mines constitutes the fuel and raw material necessary to a number of lines of manufacture. In addition to this, the products of the mills that work up this raw material are necessary to other factories engaged in the production of entirely different lines of goods. The lumber of the sawmills enters into the manufacture of furniture, the construction of houses, and the making of many domestic utensils. Iron enters into the construction of all machinery, and without machinery many of the products of the present day would be impossible.

The mountainous regions, though rugged and barren on the surface, are valuable, for without the minerals which they contain, much of the business of the world, as now carried on, would be wholly impossible.

All minerals can be divided into two great classes—metals and non-metals. Gold, silver, iron, copper and lead are examples of our most common metals. Coal, marble, granite, sand and salt are examples of non-metals. This class is much larger than the metals, and many substances found in it differ widely from each other in appearance and properties.

QUESTIONS.

Are any important minerals found in your locality? If so, for what are they used?

What is an ore? What ores can you tell by their appearance?

Why are mining towns usually so poorly built?

How many metals can you recognize? Name them.

How many different kinds of rock can you recognize? What is the difference between a rock and a metal?

CHAPTER IX.

METALS.

In general, metals have a bright lustre, are hard and are good conductors of heat; that is, they heat and cool quickly. They are also good conductors of electricity, and, with the exception of mercury, are solid at ordinary temperatures, but melt when heated to a high temperature. Many metals in their pure state are mere curiosities and only a few of the entire series enter extensively into the world's industries and commerce. The most important of these are gold, silver, copper, zinc, lead, tin, mercury, aluminum and iron.

ORES Metals are found in a pure state scattered through veins of rocks, or combined with some substance in the form of rock. Gold and copper are good examples of metals occurring in the pure state in veins. Gold is usually found imbedded in veins of quartz, and copper may be in quartz or other rock. The veins fill crevices in the surrounding rock, which is of an entirely different sort. The veins are very irregular, may be from a few inches to several hundred feet in width, and frequently send off branches in various directions. The rock in the vein and surrounding the metal is usually known as gangue. Ore in the form of rock is more liable to occur in masses. Then the rock is quarried and treated to the process necessary for extracting the metal.

GOLD Gold has been one of the longest known of the metals. It is widely distributed over the earth, and occurs free, that is, in a pure state. Wherever it occurs it is readily recognized by its color, and with few exceptions is easily obtained.

The ancients used gold for the purpose of ornaments, jewels and utensils in their sacred temples. Then, as now, a high value was placed upon it.

Production The United States, South Africa and Australia are the leading gold-producing countries of the world. The gold regions of the United States are confined to the Rocky Mountain Highlands, the Pacific Slope and Alaska, where extensive placer, or surface, mines have been recently developed in Seward Peninsula and along the Yukon River. The aggregate production of gold in the world, is some over \$300,000,000 a year. Of this amount, the United States including Alaska produces about \$80,000,000, or a little more than one-fourth.

Gold is of great importance in commerce and in the arts.

Use It will not tarnish and can not be corroded by any substance but a mixture of muriatic and nitric acids, and is the only metal that can be used for some forms of gilding, and in the manufacture of the finest quality of jewelry and ornamental ware. On account of its steady value, it has become the standard for money in nearly all civilized nations. In the United States 25.8 grains of gold make a dollar, which gives the metal a value of \$20.67 a troy ounce. In practice, a small quantity of copper and silver are mixed with the gold to harden it, so as to prevent loss by the wearing away of the coin.

SILVER Silver has probably been known as long as gold. It is as widely distributed through the earth, and is even more abundant. Unlike gold, however, it is not found in a free state, but occurs combined with one or more substances in the form of ore. Most of the ore is a dark colored rock, in which we find the silver frequently combined with lead and copper, and it is from the reduction of ores of this sort, that a large part of the silver produced in the United States is obtained. The processes are very complex, and consist in crushing the ore, washing it,

treating it with chemicals and smelting. Our annual production is about 74,500,000 ounces. The other leading silver countries are Mexico, Peru and Bolivia.

Silver is used to some extent in coinage, but largely in the manufacture of silverware and plate. Several of its compounds are also employed in photography. Gold and silver are considered



CONCENTRATORS IN A GOLD MILL

Concentrators are tables having a vibratory motion, and when in use water is constantly running over them. They are used with ore containing gold and silver. The ore is crushed very fine, then the worthless parts are separated by running the crushed ore over the concentrator. The parts containing the metal are heavier than the others and settle while the running water washes the rock away.

as the commercial metals, for the values of all commodities are measured by them, and for centuries they have constituted the medium of exchange for the world.

COPPER Copper is one of the most useful metals in the arts, and, like gold and silver, was known to the ancients who used some of its ores in the manufacture of bronze. It was

with tools of bronze that the Egyptians cut and fashioned the stones for their temples and monuments, and the possession of large mines of copper made them the leading commercial nation of their time. While copper is found in all parts of the world, it occurs in large quantities only in a few localities. The copper regions of the United States are along the south shore of Lake Superior, in and around Butte, Montana, and in several localities in Arizona.

The mines in the Lake Superior region are on the small peninsula known as Keweenaw Point, and are among the most interesting mines in the world. The copper in this region occurs as free metal, and is found in veins in rock. It is obtained by crushing the rock, then separating the metal by washing. These mines have been worked continuously since 1847, and some of them now extend over a mile below the surface, and are the deepest in the world. The ore in the Montana and Arizona districts is in the form of a sulphide, from which the copper is obtained by roasting and then smelting.

The mines of the Montana region are the most extensive and produce the largest supply. The ore in these mines is a dark slate-colored rock from which the copper is obtained by first crushing it, then washing it repeatedly upon vibrating tables over which water is running, to separate the portions containing the copper. The particles containing the metal are heavier than the others and settle, while the lighter and worthless portions are carried away by the water. The crushed ore is then roasted in large furnaces where it is brought to a red heat. This drives off the sulphur in the form of gas, and the roasted ore when smelted yields the copper. The gas driven off in roasting the ore, destroys vegetation, and scarcely a green thing can be seen in and about Butte or Anaconda, where the furnaces are located. The Arizona mines have not yet been as fully developed and rank third in the

United States, in the order of production, the Lake Superior mines being second.

The United States as a whole produces about three-fifths of the world's supply of copper, and the mines in the three regions named yield about one-half of this quantity. Our export trade in copper is quite important, amounting to something over 170,000 tons a year. About one-half of this goes to Germany, and most of the balance to France and the United Kingdom.

Copper is combined with zinc in the manufacture of brass, and with zinc and other metals for the making of various kinds of bronze. It is also used in sheets for making boilers, covering roofs and sheathing the hulls of ships, but by far the most extensive use is in the manufacture of copper wire which is largely employed in the construction and operation of electrical machinery.

ZINC Zinc occurs in ore commonly known as blende. The most valuable mines are located in the vicinity of Joplin, Missouri. Other mines of some importance are found in Illinois, Indiana, Wisconsin and New Jersey. The amount of zinc produced in the country is not large, but in considering our mineral industries, this metal deserves a notice on account of its relation to other metals with which it is combined in so many ways as to make it an important article of commerce.

LEAD Lead is found more generally in the Rocky Mountain region and in the northwestern part of Illinois, where it occurs in a compound of lead and sulphur. As already stated, much of the lead ore, especially that in the Rocky Mountain region, is combined with silver and copper, so that on reduction the ore often yields the three metals. The most extensive uses of lead are for making lead pipe, and in the manufacture of a compound known as white lead, which forms the basis of our most valuable paints.

MERCURY Nearly all the mercury produced in the world is obtained from California. Mercury is about thirteen and a half times heavier than water and at ordinary temperatures is a liquid. These peculiarities make it valuable in the manufacture of thermometers and barometers. It readily dissolves gold with which it forms an amalgam, and for this reason it is extensively employed in obtaining gold from ores in which the gold occurs in small quantities. It is also used in the manufacture of paint known as vermilion, and for silvering mirrors.

ALUMINUM Aluminum is found in all clay compounds, and exists in abundance, but as yet we have not been able to extract it from but a few of its ores. The richest of these is the mineral known as bauxite, from which the aluminum is obtained by a powerful electric current. It is only since the construction of the large dynamos at Niagara, that the production of aluminum for commercial purposes has been possible, and nearly all the supply for the world is produced by the Pittsburg Reduction Company, which operates plants at Niagara Falls and Pittsburg in the United States, and in England.

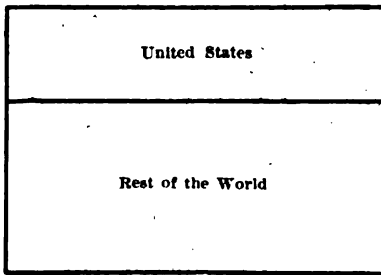
Aluminum is rapidly coming into use for various purposes. It is now employed in the construction of household utensils; it is taking the place of copper for wire in connection with electric machinery, and is used in place of stone in printing lithographs.

IRON AND STEEL.

IRON Iron is the most useful and important of all the metals. It is distinctly the metal of civilization, and its extensive use characterizes the present as the Iron Age. On account of the difficulty in extracting iron from its ores, it was not known or used for several centuries after gold, silver and copper were common. The Romans acquired the art of smelting the ore, and

used iron at first for coins, then for tools and weapons. Other nations followed the example of the Romans and improved upon their methods, and each century has seen the use of iron widely extended.

Iron Ore Iron is seldom found free in nature, but is extracted from its ore which occurs in the form of rock, and is very generally distributed over the earth. Its occurrence in commercial quantities in or near those localities where fuel is abundant

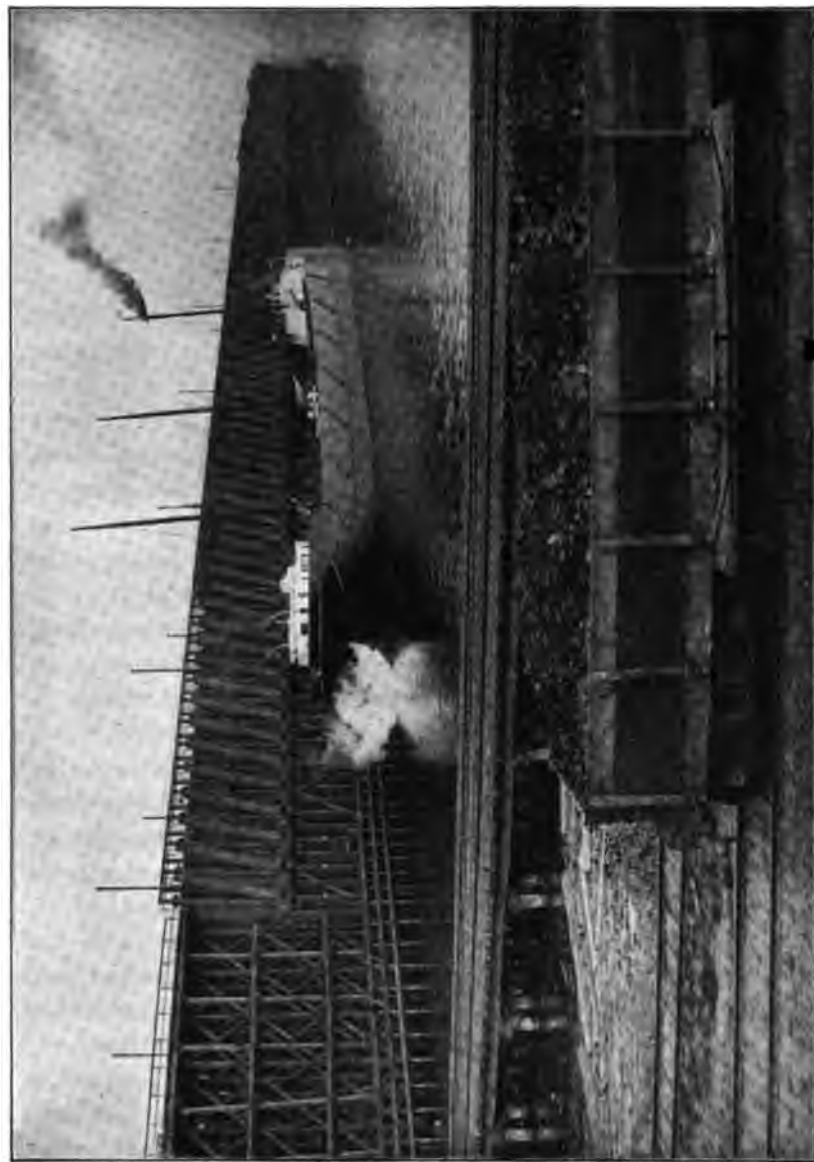


IRON AND STEEL

is one of the principal factors in a nation's prosperity. Sometimes water percolating through rock containing iron dissolves a portion of the metal, and brings it to the surface where it is occasionally deposited in bogs and marshes. These deposits look like large lumps of rusty iron, and are known as bog ore. It was from this ore that iron was first made in the United States.

Iron Regions The important iron regions of the United States occur in the Appalachian Highlands, in the Rocky Mountain Highlands, along the shores of Lake Superior, and in the Ozark Mountains, in Missouri. Of these, the Rocky Mountain deposits and those in the Ozark Mountains have not yet been developed. The iron industry began in those portions of the country that were first settled, consequently the mines in the Appalachian Highlands have been worked for a long period, and in the northern portion of this region, among the Adirondack Mountains, some have become nearly exhausted.

The most prolific sources of iron at the present time are in the Lake Superior region where large deposits of red hematite are found in the Mesaba Range in Minnesota and the Gogebio



ORE DOCK, SHOWING THE METHOD OF LOADING VESSELS

Range in Michigan, just south of the lake. In both these regions the ore occurs in the form of decomposed rock or gravel, and is in such a state that it can be loaded on to the cars by the use of steam shovels. One of these shovels will scoop up several tons of ore at a load, and it requires but a few minutes to load the car. This ore is loaded on cars specially constructed for the purpose. These cars are then run upon elevated tracks at the ore docks, where they are unloaded by dumping the ore into chutes. These chutes are of sufficient height to allow the ore to slide from them into the holds of the ships, which transport it to the iron manufacturing centers on Lakes Erie and Michigan. So perfect is the arrangement of all these appliances that a large ship can be loaded with ore in from one to three hours, and smaller ships in less than an hour. The ore is so easily mined, and water transportation is so cheap, that the ore from this region is often delivered at Cleveland or Erie, Pennsylvania, at an expense of from \$1.75 to \$3.25 per ton.

Iron Mills The great iron mills are located where the ore and the fuel required to smelt it can be the most cheaply brought together. These localities are in Western Pennsylvania, Southeastern Ohio, around the southern end of Lake Michigan, and near Birmingham, Alabama; consequently, we find Cleveland, Ohio, Erie and Pittsburg, Pennsylvania, Chicago, Illinois, and Birmingham and Bessemer, Alabama, to be our most important cities in the production of iron and steel.

Since it requires about two and one-third tons of coal to smelt a ton of ore, it is much cheaper to transport the ore into the locality where the fuel is obtained, and; in addition to this, the boats which take the ore from the Lake Superior region to the ports on the lower lakes can return laden with coal, so that with the transportation of both commodities the traffic for these lines of steamers is very profitable. Moreover, this method of transporta-

tion enables the people of the West and the Northwest to obtain their coal at a much lower rate than they could if it were transported all the way from the mines by rail. Much of the coal used in Minnesota, Wisconsin, Michigan, and even in Illinois, is brought by boats to some lake port, and from there shipped to its destination.

Smelting Iron ore is smelted by crushing the ore and mixing it with the proper proportions of coke and limestone.

The limestone does not affect the quality of the iron, but at a high temperature it fuses with the silica in the ore and forms the slag, thus setting the iron free. The smelting is done in blast furnaces which are from 90 to 100 feet in height, and cylindrical in form. The furnace is charged from the top, and the intense heat required is produced by forcing a blast of hot air through the mass after the coke has been ignited. As the iron melts it settles at the bottom of the furnace, and is drawn off through an opening made for that purpose. The slag is lighter than the iron and is drawn off through another opening above that through which the iron flows. As the charge in the furnace settles more is added at the top and the process is continued for weeks, and often for months, without ceasing.

Uses Iron is used in three forms; cast iron, wrought iron and steel. When the melted iron comes from the furnace, it is either run into steel molds or into channels in sand; in either case, it is cast into bars known as pig-iron. This is the crudest form of cast iron and is used directly in making articles, such as stoves, and some ordinary utensils where great strength is not required. These articles are cast by simply re-melting the iron and pouring it into the molds.

When pig iron is melted in a furnace in which it can be stirred or puddled, the quality of the iron is greatly improved. It loses its brittleness and can be rolled out into bars, or sheets,

without difficulty, and can be bent without breaking. This product is called wrought iron, and is used in the manufacture of rods and many articles where toughness and strength are required, though the present method in the manufacture of steel has somewhat restricted its use.

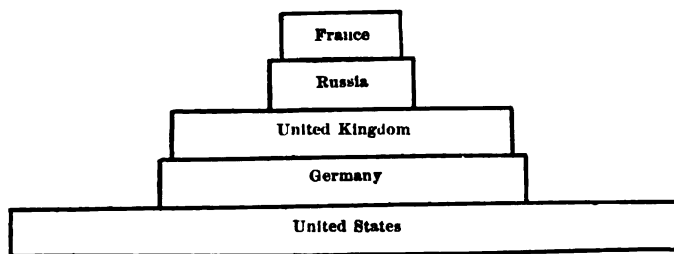


A STEEL MILL

STEEL Steel is a form of iron which contains a certain amount of carbon. This increases the hardness of the metal and also its strength. Steel is made by two methods. The old method is to pack bars of wrought iron in iron boxes with charcoal and keep them at a red heat for several days. This method is still used in the manufacture of steel of a very fine quality.

Bessemer Steel For nearly all purposes for which steel is used, it is now manufactured by what is known as the Bessemer process, which takes its name from Sir Henry Bessemer, its discoverer. Cast iron contains too much

carbon, and wrought iron does not contain enough. By the old method of making steel the carbon was burned into the wrought iron. By the Bessemer process it is burned out of the cast iron. The iron as it comes from the smelter is run into a huge egg-shaped furnace called a converter, and a blast of air is immediately forced through it. This burns out the excess of carbon. The color of the flame as it comes from the converter enables the workman to determine when the process should be stopped. A little manganese or a small quantity of some other iron ore is then added,



IRON AND STEEL

and the melted steel is then cast into bars or ingots, which are sent to the rolling-mills, where they are reheated and rolled, drawn or hammered into any form required.

The Bessemer process of making steel is one of the greatest discoveries of the nineteenth century. It has completely revolutionized not only the iron industry but many others as well. By this process the price of steel has been so reduced that it is now used for many purposes for which it was not formerly available. As a result of this discovery, the modern railway, with its giant locomotives and heavy freight cars, became practicable; employing Bessemer steel in the construction of steamships made possible the building of the great ocean liners now common in the ports of all leading commercial nations; and its use for frames of buildings has led to the modern city block often extending skyward for twenty

or thirty stories. Besides affecting these larger industries, the extended use of steel has also influenced many of lesser importance, and these are so numerous that to enumerate them would make a list entirely too long.

PRODUCTION The United States is the leading nation in the world in the production of iron and steel. She is closely followed by Great Britain, which in turn is followed by Germany. The iron industry is one of the most important in the country. While a large amount of the product is used at home, a great quantity of it is also exported to the countries of Europe, Asia and Africa. These exports are not in the form of iron and steel as they come from the smelting furnace, but in manufactured products such as bridges, rails and machinery. Minnesota and Michigan lead in the production of iron ore, while Pennsylvania, Ohio and Illinois, in the order named, lead in the production of manufactured iron and steel.

QUESTIONS.

What is a vein of ore? Did you ever see a rock with veins in it? How can you tell them?

What is placer mining? By what other methods is gold mined?

Which is the more useful metal, gold or iron? What reasons can you give for your opinion?

What makes copper so valuable? What metal has been the most recently introduced into the arts?

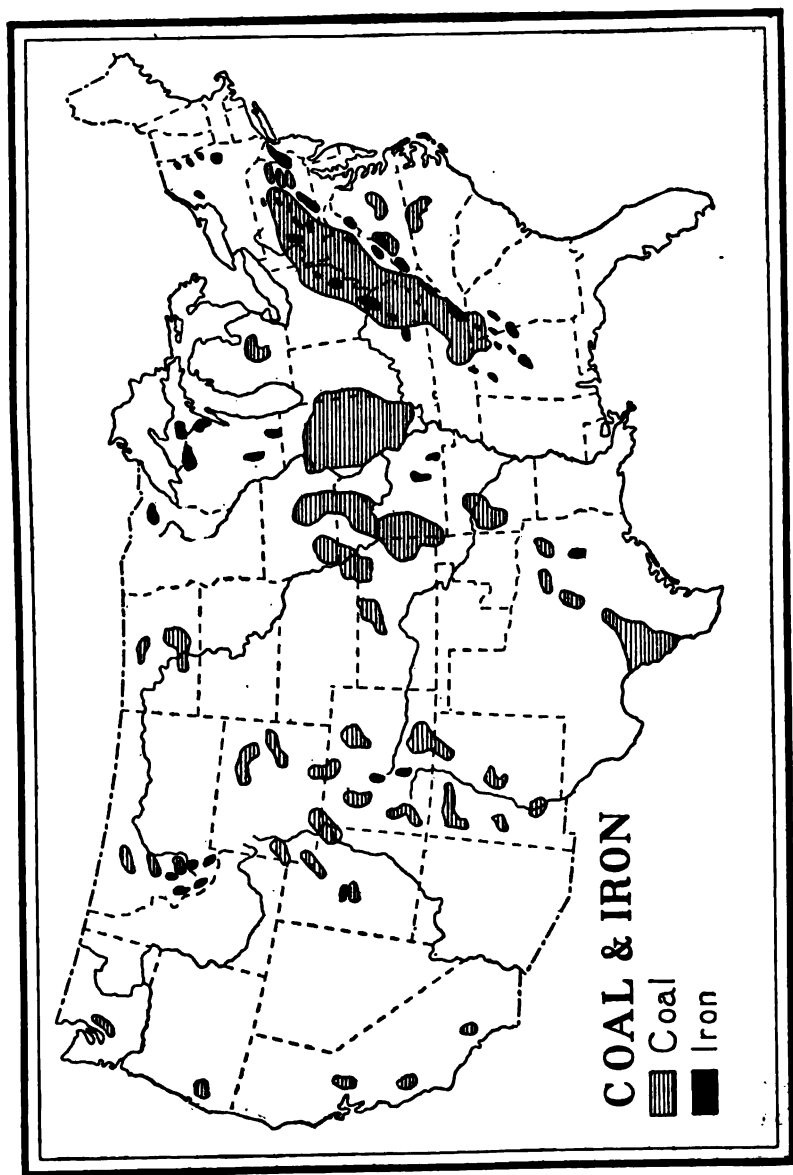
Where are the great iron and steel mills of the country located? What are the reasons for their location?

What is steel? In what respects is it superior to iron?

How is a casting, like one of the large wheels in a mowing machine, made?

Name some of the uses for which iron is employed.

What has made the United States the leading nation in the production of iron and steel?



CHAPTER X.

MINERAL FUELS.

A number of minerals are valuable on account of their use as fuel. The most important of these found in the United States are coal, petroleum and natural gas.

COAL Coal is found in seams, or veins, buried in the earth. It is widely distributed, and is found in many countries of the north temperate zone and in some portions of the north frigid zone, particularly Alaska. South of the Equator it is known to exist in Australia and South Africa.

Formation In the lowlands, in cool, temperate climates, we frequently find swamps in which, for many years, mosses, several varieties of ferns, rushes and reeds have been growing. From year to year, these partially decay at the bottom and the new growth of the succeeding seasons springs from the bed formed by their decaying vegetation. From two to four feet below the surface a formation is found that closely resembles the vegetable mold of soils. When dried, this forms excellent fuel, and is known as peat. Were peat subjected to great pressure and heat, under such conditions that the air could not reach it, it would be changed to coal.

Coal has been formed from the vegetation of the past ages by processes similar to those described in the formation of peat. This vegetation grew many centuries before any animal life existed upon the earth, and was much more luxuriant than vegetation that we find at the present day, even in tropical regions. The evidences found in coal mines tend to prove that, in the period in which these plants thrived, ferns and club-mosses grew to the size

of trees, and that these forms were interspersed with several species of large trees entirely different from anything that now exists upon the earth. These luxuriant growths of vegetation were, by movement of the earth's crust, sunk beneath the sea and covered with mud, which in time became hardened into rock. The heat produced by the pressure and movement of the rocks in the course of ages changed this vegetation into coal. The plants were so completely excluded from the air, and were subjected to such great pressure, that the coal is harder and much more perfect than charcoal, which we obtain by burning wood, or other substances, in closed vessels.

Some time after the first growth of vegetation, the land again rose above the surface of the sea, and another growth appeared, which, in its turn, was also buried and changed to coal. In some localities this process was repeated a number of times, each repetition being marked by a vein of coal. Consequently, we find the veins separated from each other by layers of rock varying in thickness from a few inches to hundreds of feet. As a general thing the coal in the lowest veins is the hardest and of the best quality, but in the mountainous regions of Pennsylvania, and some other portions of the world, the veins have been tilted so that they are now found in an oblique position, and it is not always the lowest vein that is the oldest. In the more level regions of Ohio, Indiana and Illinois, the veins are found in much the same position as they were when formed, and extend in a horizontal direction.

Some of the veins are only a few inches thick, while others attain a thickness of from ten to twelve feet. If a vein is less than three feet thick, it can not be profitably worked on account of the expense of excavating the amount of rock necessary to secure the coal. There are a number of varieties of coal, indicated by their composition and degrees of hardness. Those of the latest

formation are the softest and least valuable. The varieties generally known are lignite, bituminous, cannel and anthracite.

Lignite Lignite is a variety of soft coal that is less valuable than those that follow. In formation it is between peat and soft coal; it still retains the reddish hue, like peat, and crumbles readily. Lignite is found in a number of states west of the Mississippi, and is mined to some extent in Colorado, the Dakotas, Montana, Wyoming and Indian Territory. Since these states are located a long distance from the bituminous coal fields, lignite constitutes a valuable and convenient source of fuel. It has never been used in engines, or for manufacturing purposes on a large scale, but it is successful as a heating fuel. Lignite mines have not yet been developed to any extent, but as the demand for fuel in states west of the Mississippi increases, these mines will grow in importance and lignite will supply most of the local needs for domestic and other heating purposes.

Bituminous Bituminous coal is much softer than anthracite, and contains more oil and vegetable matter than carbon. When broken, the best quality leaves a glossy or jet-like surface. It burns with a bright flame and dense, black smoke, and gives off an intense heat. Bituminous coal is much more generally distributed over the earth than anthracite. In the United States, it is found in Western Pennsylvania, West Virginia, Southern Ohio, Indiana and Illinois. It also constitutes a great part of the coal mined in England and on the continent of Europe. This is the coal generally used in making coke, for smelting iron and for other manufacturing purposes.

Cannel Cannel coal is a variety of bituminous which occurs only in small quantities. It is sometimes used for making ornaments, because, when polished, it very closely resembles jet. It is also highly prized for burning in open grates,

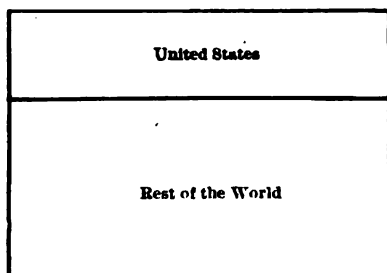
as it burns with a bright flame and with little smoke. When a piece is ignited at the end, it continues to burn like a candle until entirely consumed — a peculiarity from which this variety of coal takes its name. Cannel coal has passed through the bituminous stage and is nearly as hard as anthracite.

Anthracite Anthracite is the hardest and the most valuable coal found, either in America or England. Nature has made it by causing soft coal to be subjected to such heat and pressure that most of the oils and gases have been driven off, leaving the almost pure carbon. It has a black, glossy appearance, and burns with but little flame but with intense heat. On account of its hardness and its appearance it is often known as hard coal, and sometimes as stone coal. The largest mines of anthracite now worked are found in the eastern portion of Pennsylvania, in Nova Scotia and in England.

Coal Measures The layers of rock in which coal is found are known as coal measures. The important coal measures in the United States are found in Pennsylvania, West Virginia, Ohio, Indiana, Illinois and Michigan. In addition to these, there are measures of lignite, or soft coal, found in nearly all of the states west of the Mississippi, in small patches or large areas. Taken together, these coal measures have an area exceeding four times that of the state of New York, and a depth which has not yet been ascertained, as the veins near the surface will, with but few exceptions, be the only ones worked for years to come. This shows us that our country has a sufficient supply of coal to last its people for many generations and for all purposes. This is one of the greatest sources of our prosperity, for without coal it would be impossible to supply fuel to many portions of the country, and without fuel these regions could not be inhabited. Also, as already noted in the chapter on iron, coal is necessary for most manufacturing purposes, and were it not for the extensive supply

of this commodity many of the manufacturing industries would be impracticable, if not entirely impossible.

Mining Coal is mined by sinking a shaft into the earth until it cuts the vein. This shaft is a rectangular excavation, usually about thirty feet long and twelve or fourteen feet wide. It is divided into four compartments by vertical partitions. In two of these the hoisting cages, which are nothing more than freight elevators, operate; another is used for ventilating the mine; and the fourth for pipes used in pumping out water, for electric wires and other appliances that may be needed to make connection between the mine and the works above.



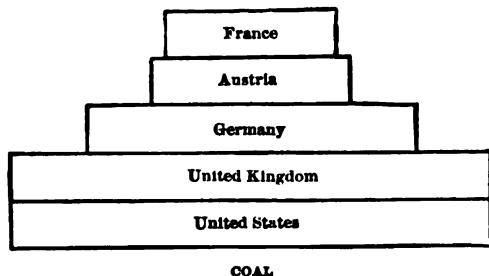
COAL

From the foot of the shaft, galleries are excavated in all directions. These galleries are intersected at frequent intervals by cross galleries, so that in a mine which has been worked to any extent, they resemble quite

closely, in their arrangement, the streets of a city. Tramways are laid in the main galleries, and upon these cars are run, either hauled by mules or electric locomotives. As the coal is broken from the veins, it is loaded upon the cars, which are hauled to the foot of the shaft and run upon the hoisting cages. As the cars reach the surface, they are run from the hoisting cages to a platform, where they are unloaded by being dumped into a chute, where the coal is separated into various sizes and each size loaded separately, either upon the car or into the boat as the location of the mines requires, and sold as nut, egg, etc., according to its size.

Transportation Whenever possible, coal is transported from the mines by boat, but in all other cases by

railway, and is taken to all cities and towns in the country. Very much of the local expense of this fuel comes from the freight, and localities far from the coal mines pay much higher prices than those near by. We have already seen, in our description of iron, that the transportation of coal from the lower to the upper lakes constitutes an important factor in the traffic of the ore boats. Besides these lines of steamers, there are numerous others that are engaged in carrying coal from Cleveland, Erie and other large cities, to the Great Lake ports. Most of this coal has to be hauled to the wharf by train, where it is loaded upon the boat, from which



it is again transferred to the docks, to be taken by train to its final destination. Yet, notwithstanding all of this handling, the freight by water is much cheaper than it would be were the coal hauled to the Northwest by railway.

Coke

A great deal of coal in West Virginia, Western Pennsylvania and Ohio is manufactured into coke. This is done by burning the coal in kilns, called ovens. The air is partially excluded so that only the gaseous matter is burned, leaving a kind of charcoal, which constitutes the coke. Coke is used in smelting iron ore, and for some other manufacturing purposes, and to some extent for heating. The coal cannot be used in smelting iron because it contains sulphur, which is injurious to the metal.

Uses

The uses of coal are so numerous that it would be difficult to enumerate them all. It is the source of all our steam power; we depend upon it for nearly all transportation, both by land and water, in the manufacture of iron and steel, and of other

metals; for warming our houses and places of business, and for the manufacture of illuminating gas. The use of coal is so thoroughly identified with our life and industries that, were its supply to cease, the business of the country would be demoralized. No more impressive lesson of the relation of this mineral to our industrial life could well be given than that resulting from the shortage of coal in the winter of 1902-03, caused by the great coal strike in the anthracite mines in Pennsylvania. New York, Boston, and many other large cities in the Eastern states, which depended almost entirely on this source of supply for their coal, were obliged to close manufactories, to reduce the number of trains upon their railways, and in many other ways change the ordinary run of business, while many people were deprived of their usual supply of fuel for domestic purposes.

The annual output of the United States is about 225,000,000 tons of 2,240 pounds; 50,000,000 tons of this are anthracite, and the balance bituminous. The United States produces the largest amount of coal of any country in the world. It is closely followed by the United Kingdom, which, until within a few years, was the leading producer. Germany produces about 150,000,000 tons, and other countries only small quantities. The three greatest coal producing countries are also the three greatest manufacturing countries.

PETROLEUM Next to coal, petroleum is our most important mineral fuel. It is found in reservoirs in the earth, and is obtained by boring wells. The name, which means rock oil, was given it because the oil was obtained by boring into soft layers of rock, which are saturated with oil. So far as known, petroleum is not very generally distributed over the earth. The regions in which it is found are known as the oil fields, or oil regions. In the United States these are located in western Pennsylvania, West Virginia, the southern part of Ohio, portions of

Indiana, in Colorado, southern California, Texas and Kansas. Outside of the United States Russia is the only country in which petroleum is found in large quantities, though wells of considerable importance have recently been sunk on the island of Java. The Russian oil fields are in the vicinity of the Caspian Sea.

History Petroleum has come into use within the last half century. While the existence of this oil was known to the Indians for hundreds of years, and it was used by them as a medicine, it was not discovered in large quantities until 1859. In that year Col. E. L. Drake of Titusville, Pa., bored a well in search for oil which he expected to use in the manufacture of a remedy for rheumatism that was placed upon the market as "Seneca Oil." His experiment was the first act in the development of an industry that has become one of great importance. After sinking the well sixty feet, Colonel Drake struck a flow of oil which immediately rose to the surface. The first year, this well yielded 2,000 barrels. The year following two other wells were sunk in the immediate vicinity, and the entire yield amounted to 500,000 barrels. It was at once seen that there was an abundance of oil, and that it could be supplied in such quantities as to make it available for light and fuel. Companies immediately sprang up, and within the next five years, what is known as the oil region of Pennsylvania became dotted with derricks and perforated with wells. The industry continued to increase until now the annual output amounts to about 70,000,000 barrels, of 42 gallons each.

Refining As it comes from the well, the oil is known as crude petroleum. It is usually of a dark brown color, sometimes almost black. It emits a very disagreeable odor, and contains a number of exceedingly volatile liquids. In this condition it can be used only for fuel. Since its most extensive use is for illuminating purposes, most of the crude petroleum is refined before being placed on the market. Refining consists of distilling

the oil at a very low temperature with sulphuric acid, and other chemicals, so as to separate these volatile liquids from each other and from the heavier liquids used only for illuminating purposes. The crude oil is run into steel tanks having a capacity of 1000 to 1200 barrels, and allowed to distil over a slow fire. The most volatile liquids, naphtha, gasolene and benzine, pass off first, and are followed by kerosene. This is often further purified by being



OIL WELL AND STORAGE TANKS

re-distilled and washed, to remove whatever volatile substances escaped the first distillation. After the kerosene has all been drawn off a dark colored liquid remains in the tank. By further distillation this yields paraffin, which resembles a white wax, and a lubricating oil. The refuse of the tank contains more or less coal tar, from which some of our most beautiful dyes are obtained.

The uses of most of the petroleum products are very familiar.

Gasolene is used in the manufacture of an illuminating gas, and as a fuel in gasolene stoves and gas engines. Benzine is used in dissolving gums, in the mixing of paints, and for laboratory purposes. Naptha has a similar use, and is also extensively employed in the manufacture of varnish. Kerosene is the most valuable product of the petroleum distillation, and is obtained in larger quantities than the others. Except in large cities, it has become the universal illuminant for dwellings, parks, buildings, and in some places, for streets. It has the advantage of giving a strong, clear light, and being comparatively inexpensive.

Crude petroleum is used as a fuel in localities where coal and wood do not occur. For this reason the discovery of oil in California and Texas has been of great advantage to the people of those regions. The oil from these fields is not suitable for refining, and is extensively used, not only for heating and cooking purposes, but also as a fuel in locomotives and for driving stationary engines. This use of petroleum has greatly facilitated transportation on several lines of railway in Arizona, New Mexico and southern California.

Transportation The growth of the oil industry has led to many new developments in the methods of transportation. At first it was carried from the wells in barrels, which were hauled on wagons to the nearest railway station or refinery, but the poor roads made this method almost impracticable. Whenever possible, the oil was loaded onto boats, some of which had tanks constructed for the purpose, while others received the oil in barrels. These were floated down the rivers to the point of destination or of trans-shipment, but the railway soon became the most important factor in the transportation. At first the barrels were loaded on the cars, but in a short time tank cars, constructed especially for the purpose, came into use. These cars are now familiar in all parts of the country. The tanks resemble a huge

steam boiler with a dome, and have a capacity of several hundred barrels. Oil receiving stations are now established in every large town. These stations contain large steel tanks into which the oil is unloaded from the cars, and from which it is distributed to merchants in tank wagons. From the merchants it reaches the consumer.

But in the large oil centers, pipe lines have since taken the place of cars. These lines are laid similar to gas or water pipe systems. Small pipes run from each well to large mains which finally unite into one large line that leads from the oil fields to the refinery. The pipes are made of steel and are of great strength. By their use, oil can be conveyed hundreds of miles without handling. Pipe lines extend from the oil fields in Pennsylvania to Philadelphia, Pittsburg, Cleveland, Baltimore and New York City. Another long line is one reaching from Kokomo, Indiana, to Chicago. Pumping stations are established at frequent intervals, by the use of which the oil is forced along on its journey.

The Russian field produces more crude petroleum in a year than those of the United States, its output being about 82,000,000 barrels. These two countries produce ninety-three per cent of the world's product, but the United States exceeds all other countries in its manufacture of petroleum products. In addition to those consumed at home, it exports large quantities to the countries of Europe. The exported product crosses the ocean in tank steamers constructed especially for this trade.

NATURAL GAS Another important mineral fuel is natural gas. This is usually found in the same localities as petroleum. The portions of the United States which have been able to make profitable use of this fuel are Western Pennsylvania, especially in the vicinity of Pittsburg, some localities in Southern Ohio, and in the central part of Indiana. The gas is obtained by sinking wells, the same as for petroleum. In some instances, it is

found confined under very great pressure, which, when piped, furnishes a steady flow that, when ignited, gives a great heat, though it is not very good for illuminating purposes.

Natural gas is an ideal fuel for the manufacture of glass or the smelting of iron or steel, as it contains no sulphur or other impurities that will injure the product. For this reason, many glass factories and iron works have moved into the natural gas belt. But the extensive use of the gas has caused the pressure to decrease rapidly for the last few years, and it seems quite evident that the supply is becoming exhausted. The gas has been piped, in a manner similar to petroleum, as far as Chicago, where it is used for heating purposes. Natural gas differs commercially from almost every other commodity in that it is not transported any distance from the locality in which it is found.

QUESTIONS.

Examine a piece of charcoal. How does it differ in structure and hardness from anthracite? From bituminous coal?

From what region is the coal used in your locality obtained?

Why is coal more expensive in Minnesota than in Illinois?

Where are the great coal docks of the United States located? Give the reason for their location.

What products are obtained from petroleum? Which of these is the most valuable?

What is meant by "refining" petroleum? Where are the great refineries located?

How can you account for the rapid growth of the petroleum industry?

CHAPTER XI.

ROCK AND SOIL PRODUCTS.

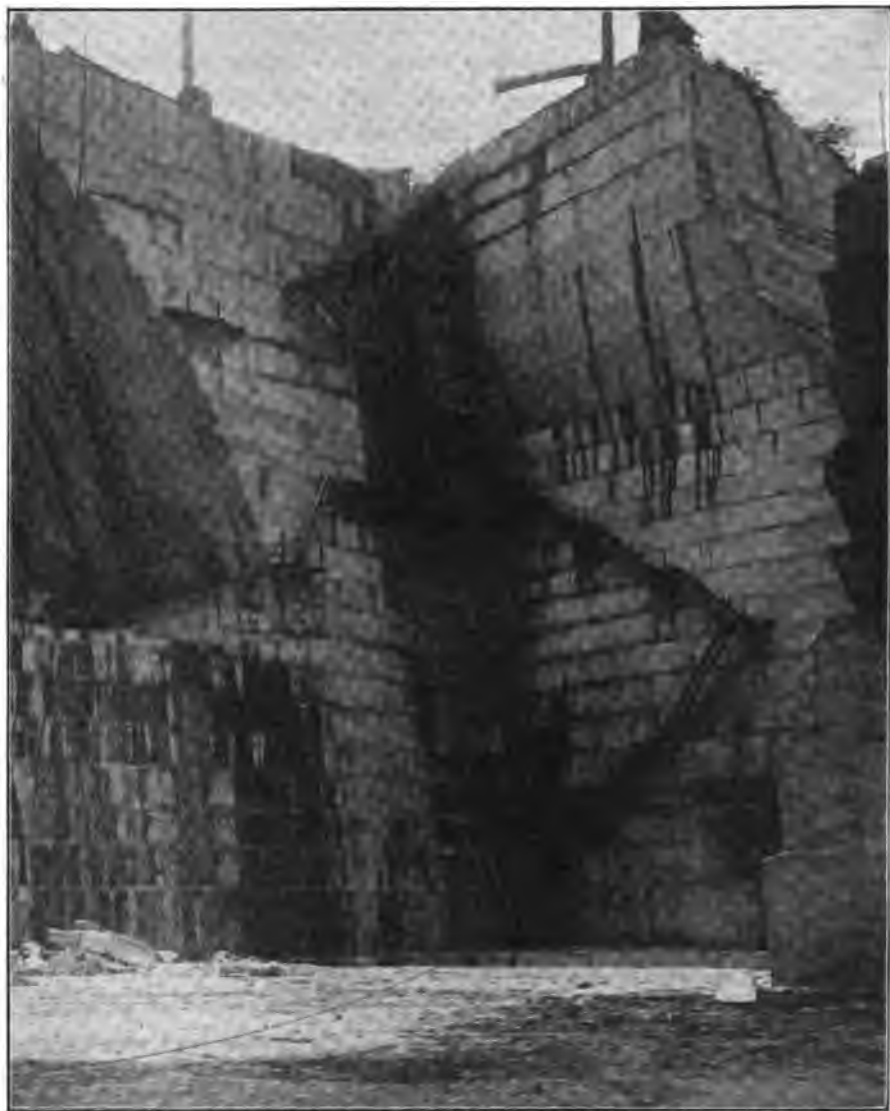
A number of minerals on or near the surface of the land, are important on account of their use as constructive material. The most valuable of these are stone, clay, sand and cement.

BUILDING STONE

The term building stone may be applied to any stone that can be used in the erection of buildings or other structures. The most important varieties are limestone, marble, granite, sandstone and slate.

Limestone Limestone is one of the most common rocks, and occurs in a number of forms. It is hard and strong, and on account of its wide distribution, can usually be obtained near the place where it is wanted, thus saving great expense in transportation. It is not a decorative stone, and can only be used for rough work, such as basement walls and the outside walls of some large buildings. Some varieties are extensively used in the manufacture of quicklime, which in turn is used for making mortar and other kinds of cement.

Marble Marble is a crystallized limestone which has been changed and purified by heat, caused by some movement of the rock after it was formed. It is found in large quantities in Vermont, Georgia and Tennessee. There are many varieties of marble, each of which has its peculiar color and degree of hardness. These adapt marble to a great variety of purposes. The stone is easily worked, takes a high polish, and when protected from the weather is very durable. Its former use in this country was confined almost exclusively to headstones and statuary, but since it has been quarried on such a large scale as it now is,



MARBLE QUARRY, RUTLAND, VT.

the uses have been widely extended. We now find marble employed for the walls of buildings, and specially for finishing interiors of public buildings, hotels and large city blocks.

Granite Granite is the hardest and strongest of all the building stones. It varies in color from nearly white to a very dark gray, which is almost a black. Some of the best granite has a reddish color. This rock occurs in many places but is extensively worked in the New England states and Minnesota. It takes a high polish, and withstands the action of the weather better than marble. For this reason it is now quite extensively used for headstones and statuary that is to be placed in public parks. Granite is especially valuable as a building stone where great strength is required, as in the piers of railway bridges, and for the foundations and walls of large buildings.

Sandstone As its name implies, this rock consists of sand, cemented together by some other material. As a building stone, its use is confined almost entirely to the walls of dwellings and some other small structures in which artistic appearance is desirable. It is not a strong rock, and can not be successfully used in many places where granite and limestone are employed.

Slate Slate is a clay rock, which occurs in thin layers. On account of its structure, it is easily split into very thin slabs. The most extensive quarries are in Pennsylvania and Vermont. Slate is used for covering roofs, for finishing interiors and for making laundry-tubs, sinks and blackboards.

Clay Clay is a very common mineral and is found in almost every locality. When dry, it is quite hard, but when moist it becomes plastic and can be easily worked, either with tools or with the hand. It is not used alone as a building material, but, when combined with a certain proportion of sand, it constitutes the material from which brick and tile are made.

In the manufacture of brick, the clay and sand are ground with water to make the mixture plastic. It is then pressed into molds, which form the brick. From the molds, these are carried to the drying-shed, where they remain for a short time to become hardened. They are then placed in large kilns, where the layers of brick are so arranged that the fire can pass between them in such



A GRANITE QUARRY

a way as to heat all the brick evenly. The brick is then burned for two or three days, being heated to redness. By this process, the sand and clay are hardened, so that when cold the brick is as hard and strong as many varieties of building stone. The largest brick works in the United States are along the Hudson River; but the industry is very generally scattered over the

Central and Western States, where brick is especially valuable because of the lack of suitable building stone. The entire industry in the United States amounts to about \$95,500,000 a year.

Other clay products of importance are tile, terra-cotta — used for ornamental work in buildings — and pottery, which is manufactured from a fine variety of clay, but can not be considered as building material. The pottery industry in the United States amounts to about \$17,000,000 a year.

Sand Sand is composed almost entirely of grains of quartz, which, by the action of wind and water, have been separated from solid rock. It is particularly valuable for the manufacture of brick, tile and mortar and cement.

CEMENT Numerous kinds of cement are on the market. Nearly all of them are made by the grinding of some variety of limestone with another rock and burning the mixture. Hydraulic cements will harden under water and are used in cementing cisterns and stones in the piers of bridges and other structures exposed to water. When mixed with crushed stone and sand, cement forms concrete, which is extensively used in constructing the foundations of heavy buildings and bridges and for laying sidewalks.

The industries arising from the use of these materials are extensive and important. From the nature of the material they are also decidedly local in character. All of this raw material, on account of the expense of transportation, must be worked in its immediate locality; therefore, we find brick yards where clay is abundant, and works for cutting and finishing stone at, or near, the quarries, as the finished product can be transported at much less expense than the raw material.

SALT Salt is especially important, because it is the only mineral used as an article of food. It is obtained by evaporating the water of the sea or salt lakes, or from salt springs and wells, and by mining, when it occurs in deposits in the earth.

Most of the salt manufactured in the United States is obtained from salt wells. These wells may be natural or artificial. They are natural when the salt water is found in the earth and can be obtained simply by pumping. They are artificial when the salt water is procured by pouring fresh water into the well and allowing it to dissolve the salt from the vein in the earth and then pumping it out. Salt works in the United States are found at Syracuse, N. Y., and at numerous places in Michigan. Nearly all the salt manufactured at these places is of a high grade and is used for table and dairy purposes. Salt is also used in the manufacture of various compounds of soda and for glazing a cheap quality of pottery ware.

GRAPHITE Graphite, or black lead, is a variety of carbon.

The largest deposits in the United States are in the vicinity of Ticonderoga, N. Y., where it is quite extensively mined. Graphite is a very valuable mineral and is used in the manufacture of lead pencils and crucibles, for lubricating machinery and for various kinds of polish.

The combined mineral industries of the country rank, in importance, next to those of agriculture. As we have seen, they are widely distributed and give rise to a large number of occupations. On this account, it is impossible to separate all of them from manufacturing industries.

QUESTIONS.

What rocks in your vicinity are used for building or other purposes? Make a collection of specimens of the different minerals in your town or county.

What are some of the articles made from clay? Why are bricks and pottery "burned"?

Name the different purposes for which you have seen marble employed.

Why does the United States quarry so much more marble than Italy?

What are the different purposes for which salt is used?

CHAPTER XII.

MANUFACTURING INDUSTRIES.

IMPORTANCE Next to agriculture, manufactures are the most essential condition to a country's prosperity, and the position of a nation in the scale of civilization is closely related to the extent and variety of its manufacturing industries. These industries make use of the natural products of a country. Before these materials are manufactured, they are known as raw material. Timber, iron-ore, corn and stone are good illustrations.

Manufactures increase the wealth of a country by turning out products that are far more valuable than the raw material. This value is added almost entirely by the labor expended in transforming this material into the manufactured product. The goods of the factory are also sold at a much greater profit than the products of nature. In addition to this, manufactures give rise to a great many occupations, and among these each one can find an opportunity to do that for which he is best suited. This enables men to produce more than they could if all had to work at the same occupation, for each succeeds best by following the vocation suited to his tastes. Manufactures also increase the demand for goods. The great number of callings in a manufacturing community multiplies wants. The blacksmith needs tools and raw material of one sort; the carpenter those which are not suited to the blacksmith, and the weaver still others, so that in order to supply the needs of all, a great variety of commodities becomes necessary.

LOCATION The location of manufacturing industries is determined quite largely by geographical conditions. The most important of these are the presence or proximity of raw

material, available power, good transportation facilities and an accessible market for the manufactured articles. The first cause is of such nature that it can be, and often is, overlooked, as raw material is frequently transported a long distance before it is converted into the manufactured product.

Power In the early history of the country water power was universally employed for propelling machinery, and we find the manufacturing industries located in New England and the North Atlantic States, where the numerous small mountain streams furnished an abundance of power. Here were erected the first cotton mills, and cotton was brought to them from the South. Here also were established the first smelting furnaces for the reduction of iron-ore, but both the ore and the fuel were found near at hand.

Steam Power The advent of the steam engine removed in a measure the necessity of locating factories where water power could be obtained. The only disadvantage in the use of steam is that it is more expensive than water, yet it often happens that the expense of fuel is less than the difference in the cost of the transportation of the raw material and the manufactured product. For this reason we find steam sawmills erected in or near the lumber camps, and flour mills on the prairies of the wheat growing states. The use of steam power has also made it possible to locate manufactories in and near the great centers of trade, where they can secure the advantage of the means of transportation which are found in such centers. The effect of steam as a motive power has been to establish large factories through the Central and Western States which by their output now have a strong influence upon the manufactures of the older states. While these states are still the leading manufacturing centers of the country their relative importance is very much less than it was a decade or more ago.

Electric Power The application of electricity to the operation of machinery has greatly extended the possibility of placing factories wherever their location would be most advantageous. It has also brought into use the water power of hundreds of streams that before were entirely useless, because their location was such that no factories could be erected on or near them. Now, by means of electric cables power generated by mountain streams may be applied to the operation of motors scores, and even hundreds, of miles away.

The most noted illustration of such application of power transmitted over a long distance is found in the works of the Bay County Power Company of California. This company placed a dam across the Uba River in the Sierra Nevada Mountains and secured a fall of 715 feet. The current furnished by their dynamos is used in Oakland, 142 miles distant, and in Stockton, which is 218 miles away; while still another line reaches San Francisco, after traversing a route 222 miles in length. In each of these cities the electric current is applied to operate the street cars and for driving the electric motors in numerous factories. The best example of the transmission of power on a large scale is that at Niagara, where the powerful current is used to manufacture electricity, which furnishes electric light and motor power in Buffalo and a number of other cities in New York State.

Transportation Transportation is a very important factor in determining the location of the manufactory, as the expense of freight greatly reduces profits. Transportation by water is cheaper than that by railway; therefore, the manufacturers of heavy wares endeavor, as far as possible, to locate where they can ship their products by water routes; hence, we find that many ports on sea, lake and river have become important manufacturing centers. The railways have made inland transportation comparatively cheap, and many factories are established in a locality

where their product is used. The great agricultural implement factories of Chicago, and the furniture and piano factories found in numerous western states, are good examples of such location.

The rapid extension of electric railways is also advantageous to small factories in country towns, since these railways afford a cheap and convenient means of transportation of both the raw material and the manufactured product. These roads seem destined in the near future to exert considerable influence in locating manufactories.

The most important economic reasons in determining a location are an early beginning and a local demand for the product. The New England factories obtained their hold upon the country largely because they were the first of their kind. While, in the beginning, their output supplied only the local demand, yet, in a short time, they were enabled to supply the demands of a much larger territory, and by being in condition to take advantage of these demands they obtained a hold upon the country, which has made it impossible for later establishments of the same sort to displace their goods.

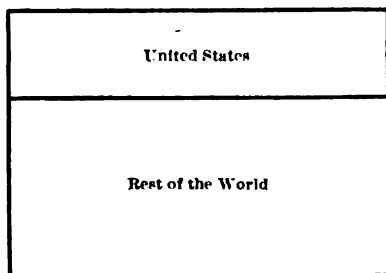
The local demand for boots and shoes, flour, furniture and many other common articles, is the principal cause for the erection of so many factories in the West and Northwest, and most of these are doing a thriving business.

MANUFACTURING CENTERS

Most cities have been built up around manufacturing industries, or have had manufactories added after they were established. The beginning of Minneapolis was in the erection of sawmills and grist-mills. At the time the first mills were erected, the lumber and the water power were near each other. As the Northwest became settled, the demand for manufactured products increased, and the city added steam power to her water power and continued to increase her mills until she became the largest flour producing

city of the world. The importance of Lowell, Mass., is due almost entirely to her cotton mills. This is equally true of many other towns in New England and New York; while Birmingham, Ala., has been developed into a thriving city within the last few years on account of its favorable location for the manufacture of iron and steel.

The United States is the largest manufacturing country of the world. The value of her manufactured products exceeds \$13,000,000,000 a year, which is more than twice the value of the manufactures of the United Kingdom. The country is also noted for the variety of its manufactures. This is caused by our great extent of territory, difference in climate and the diverse local conditions which adapt so many localities to special lines of manufacture. In addition to this, the inventive genius of the American people, and their high standard of living have created demands for a great variety of products. About seven-tenths of our manufactures are consumed at home, leaving only a small portion for export.



MANUFACTURES

With the increase in population it is probable that a still larger proportion of our manufactures will be required for home consumption. If this should be the case, our exports would fall off. However, this condition of affairs would not necessarily indicate a lack of national prosperity. Every country makes such uses of its products as are best suited to its economic conditions, and the amount of exports is not always a true indication of a country's prosperity.

QUESTIONS.

Show how manufactures increase the wealth of a country.

What effect has the development of electric power had upon the location of manufacturies? Is this beneficial? Why?

Why were the first manufacturing centers located in the New England and the Eastern States?

Why was the erection of cotton mills in the Southern States so long delayed?

What causes make the cities located on the Great Lakes important manufacturing centers?

What causes have combined to make the United States such an important manufacturing country?

CHAPTER XIII.

TEXTILE FABRICS.

Clothing is necessary to life and comfort, and the farther a people are removed from the equator, the more indispensable it becomes. We use clothing for three purposes: decency, comfort and ornament, and because they are so intimately associated with our welfare, the products of the textile industry maintain an especially intimate relation to us.

IMPORTANCE The manufacture of textiles is one of the most important industries of the country and the world, and it seems eminently fitting that the people who make the wisest use of the textile fabrics should become the most skilful in their production. These are the people of the temperate zones, and the nations of the north temperate zone now practically supply the fabrics for the world.

There are various branches of the textile industry, such as the manufacture of yarns, knit goods and woven goods; and to these must be added the art of dyeing, which is a feature of each branch. The fibers used in the United States are, in the order of their importance: cotton, wool, silk, flax and hemp. In some fabrics we find two or more of these fibers mixed. The most common mixture is that of cotton with wool. Silk is also mixed with wool, and with cotton, and, occasionally, with linen. These mixtures enable the manufacturer to produce a much larger variety of fabrics than he could by using only one kind of fiber. This variety is also increased by the degree of fineness of the work and by various methods of weaving and finishing the cloth.

HISTORY The manufacture of textile fabrics in America began with the settlement of the colonies. Every household had its spinning-wheel and hand-loom, and nearly every farmer raised sheep and flax, and it was a part of the work of the women in each family to manufacture the cloth required for clothing and bedding. Since all this work had to be performed by hand labor, and with the crudest machinery, the task was no light one. When the population had increased to such an extent as to cause numerous towns to spring into existence, small factories were erected, which, in a measure, relieved the women from manufacturing cloth, though, in the farming communities, this practice continued for many years after the Revolutionary War.

While in the beginning simple machinery operated by hand power made it possible for any one to engage in the manufacture of yarn or clothing, with the advent of the factory more complex machinery was introduced. This required an investment of capital, and as the industry grew we find that factories increased in size and capital became more and more concentrated, until the textile industry was located in a few large centers of the New England States. The most important of these were Lowell and Fall River, Massachusetts, Nashua and Manchester, New Hampshire, and some smaller towns in Rhode Island and Connecticut.

During the last quarter of a century the United States has made much greater progress than other countries in the manufacture of textiles, though she does not lead the world in her output of this product. Some of the most delicate and ingenious machinery employed in the production of the finest and most beautiful fabrics is the product of American ingenuity, while American methods of management have made it possible to operate the large factories in this country on such plans as to produce better results than have been secured in the countries of Europe.

The development of the textile industry is due to four inven-

tions: The spinning-jenny by Hargreaves; the water frame by Arkwright; the mule-jenny, which was a combination of the spinning-jenny and the water frame, by Richard Compton; and the power-loom by Edmund Cartwright. All of these inventions originated in England and were produced by English workmen. Each made it possible for one operator to do the work that it would require scores of persons to perform by hand labor. The first of these inventions came into use in 1767, and the last in 1785. Thus within a period of eighteen years the textile industry of England was revolutionized by the ingenuity of her workmen.

The increase in cotton manufacture, resulting from these inventions, created such a demand for cotton that it was impossible for the planters to raise and prepare a sufficient quantity to supply the market. This difficulty was met by the American invention of the cotton-gin, by Eli Whitney, in 1792. This has already been described in the chapter on cotton. Historians are agreed that no other inventions ever did so much for a people as have the inventions named for the English-speaking nations, and it is in these nations that the manufacture of textile fabrics has reached its highest development.

Factories seldom deal with retail merchants or customers. When the goods are finished they are put up in bales of from twenty to fifty yards each, and the most expensive qualities are carefully wrapped in paper before boxing. The goods are shipped from the factory in large boxes or cases, and are sold directly to the wholesale merchant, through whom they reach the retail trade which disposes of them to the individual customers. Besides the goods manufactured in this country, large quantities of woolens and silks are imported, though American goods are sometimes placed upon the market as imported, and the product of the American mills is of such quality that it is often difficult to distinguish between the finest fabrics made at home and those of

France, Germany or England. Japanese and Chinese silks can easily be distinguished because of their peculiar fiber. No mills of America or Europe manufacture a fabric of this type.

COTTONS The cotton is received in the bale. It is first cleaned, then carded suitable for spinning. The fiber is spun by twisting it on a spindle. Each spinning-mule, or mule-jenny, contains a large number of spindles, each of which twists a thread when the machinery is in operation. One operative can tend two of these machines, and is enabled to spin several hundred threads at once. As the yarn is spun, it is wound upon bobbins, from whence it is taken to the looms.

All weaving is done by power-looms, which are so nearly automatic in their action that a good weaver will tend four or more. In large factories several hundred looms are generally placed on the same floor. Each loom is constructed especially for the kind of cloth that it is to weave, so that we find webs as wide as the widest sheeting and as narrow as the narrowest ribbon, but the ribbon looms are usually so constructed that the same loom weaves a number of ribbons at once. In every case the greatest economy of construction is observed, so that the mill will produce the largest quantity of cloth at the least possible expense. It is only by the practice of this economy that it has been possible for the manufacturers to place cotton goods on the market at such prices as to enable cloth of a good quality to be purchased for a few cents a yard.

Calicoes have received the commercial name of prints, because the colors are stamped upon them by a printing machine constructed especially for the purpose. This machine quite closely resembles the ordinary printing press, only it has more cylinders, and on this account is somewhat larger. Each cylinder contains etched figures of the whole, or a part, of the pattern, as the case requires. If the calico is printed in only one color, the entire pattern is found on one cylinder. If the pattern is to be

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printed in several colors, each cylinder contains only that portion of the pattern that is produced by a single color. As the cloth passes over these cylinders, each in its turn stamps its part of the figure on the calico, and the cylinders are so nicely adjusted that the parts of each figure fit into each other, enabling the last cylinder to complete the design.

For gingham the yarn is dyed before weaving, and the pattern is produced in the loom, which is so constructed as to weave the desired pattern automatically.

Fabrics of a coarse and medium grade are those in most demand in our markets. Sheetings, shirtings, gingham and calicos constitute the bulk of the American output, though small quantities of very delicate fabrics are made.

As already noted, the earliest development of cotton manufacturing was in the New England States, and Massachusetts still leads in this industry, but since 1890 Georgia has made great progress in the erection of cotton factories. Here the immediate presence of raw material and the abundance of cheap labor make such a combination of circumstances as will enable the Southern States to become sharp competitors of New England in the near future. The United States is the second country in the world in the manufacture of cotton fabrics, being exceeded only by England. If we should attempt to measure, in square yards, the amount of cotton cloth produced in the country in one year, the number would be so large that we could not comprehend it. If this cloth were spread out in one place, it would cover an area of 4,915 acres, or somewhat more than eight square miles. The value of the cotton product, including cloth and knit goods, is some over \$340,000,000 per year.

WOOLENS Woolens were the first textile fabrics manufactured in America. The fiber of wool is much more easily worked than that of the cotton plant, and, for this reason, is

especially suited for clothing of people following the vocation of agriculture, and living in a cool climate. The fiber can be spun and woven by the use of the most simple machinery, and is particularly suited to the conditions which are always found in a newly settled country. We have already noted how cloth was manufactured in the homes of our forefathers. The advent of machinery caused this industry to gradually change from the homes to the manufacturing centers, until now spinning-wheels and hand-looms are so rare that they have become curiosities.

What is true of the machinery for the manufacture of woolens by hand is equally true of their manufacture in large factories. The machinery required is less complex and somewhat less expensive than that found in cotton mills. For this reason, small woolen mills can be operated at a profit, and we find them very generally scattered throughout the New England and Eastern States, where the manufacture of woolens is located. As in the case of cotton, Massachusetts leads in this industry. The small mills produce goods of as fine a quality and finish as the large, and furnish opportunity for employment to a large number of people living in villages or rural communities.

There is a great variety of woolen fabrics, ranging from the finest grade of dress goods to heavy beavers, felts and carpets. Fabrics of a medium grade of fineness are in the greatest demand and constitute the largest part of the output. The style of the cloth depends upon the method of spinning and the finish after the fabric is woven. Worsteds are made from yarn that is hard twisted, while cashmeres and other soft fabrics come from yarn that is loosely twisted. The finest fabrics are made from wool having the finest fiber. Such fabrics as delaine are made from wool of a long, fine fiber, while those woolens used in the manufacture of men's clothing are made from a medium grade of wool. The coarse fabrics come from a cheap grade of coarse wool.

In extent, the woolen industry does not equal that of cotton, yet, owing to the greater value placed upon woollens, the value of the yearly output is somewhat more than that of the cotton industry, being about \$395,000,000. As in the manufacture of cotton, the United States is also exceeded by England in the manufacture of woolen goods.

SILK The people of the United States are the largest users of silk in the world. Much of this is imported, but a large quantity is also woven in this country. Several attempts at growing silk have been made in the United States, but they have never succeeded because it requires so much labor to raise the silk worms that the United States can not afford to compete with other countries in this industry, and our silk mills are obliged to obtain their raw product from France, Italy, Japan and China. The silk usually reaches the American manufacturer in skeins, just as it is wound from the cocoons. It is then ready for the process known as throwing, which is the silk manufacturer's term for spinning, or twisting. After throwing, the silk is ready for weaving and is passed to the looms. The great silk mills are nearly all located in New Jersey, Pennsylvania and Connecticut. Probably nine-tenths of the silk manufactured in the country is made in these states. An important feature of this industry is the manufacture of sewing silk, to which entire mills are devoted.

The value of silk manufactured annually is some over \$107,000,000. This industry has the peculiar feature of importing its raw material from a great distance, for the purpose of manufacturing it at home. Aided by government protection, the manufacture of silk, which started in a very small way, has now become an industry of considerable importance and one of great value to the people, because goods of the same quality can be manufactured in the United States and placed upon the market at a lower price than they can be imported from either Europe or China.

LINEN The manufacture of linen is carried on in the United States to only a limited extent, and is confined almost entirely to the coarser fabrics, such as crashes and towels. All the finer grades are imported from Ireland, Holland and Belgium. The principal reason for this is that the farmers can receive much better returns for their labor by employing it in other ways than preparing flax for market, and the manufacturers are unable to find suitable localities for bleaching in the open air, the climate of the United States not being well suited to this purpose. Large quantities of flax are raised in the country for the seed, which sells for a good price, often as high as a dollar a bushel.

HEMP AND JUTE The manufacture of hemp and jute is confined almost entirely to making binding-twines and other cordage. The binding-twine industry is one of considerable importance because of the great quantity used in the grain-producing states. In some states this twine is manufactured in the penitentiaries, but the greater part of that placed upon the market is produced by the great harvester works in Chicago and other large cities. It is shipped from these factories in car-loads, and sold to farmers through dealers in agricultural implements. Some jute is used in the manufacture of sacking and other coarse fabrics employed by carpet manufacturers, but the industry is so comparatively small, that it needs only passing mention.

QUESTIONS.

Why were woollen and linen fabrics made in the United States so long before the manufacture of cotton was introduced?

Why has the manufacture of textiles in England and the United States reached its present development?

Why are cotton goods so much less expensive than woollens? Why are calicos called "prints"?

Which are the more durable, cotton or linen goods?

Why is the manufacture of silk goods so extensive in the United States, when all the raw material has to be imported?

Why is so little linen manufactured in the United States?

CHAPTER XIV.

LEATHER PRODUCTS.

FURS The skins of animals have been used for clothing in all ages. When preserved with the hair on, they are known as furs, and in this form the skins of some animals, particularly the otter, the sable and the fur-seal, constitute some of the most beautiful and expensive material from which wearing apparel is made. Most of the fur-bearing animals live in a cold climate and in regions sparsely populated. Only a few are now found in the United States, and the taking of animals for their furs is no longer an important industry of the country.

LEATHER When the skins of animals are dressed without the hair, they form leather. Raw skins from cattle and horses are known to the trade as hides, while those from small animals are designated as skins; as sheepskins, calfskins and goat-skins. Leather has become such a necessity that none of the leather manufacturing countries produce enough hides from the animals killed to supply themselves with shoes, so in many of the grazing regions of the tropics and the south temperate climate thousands of animals are killed just for their hides, to ship to the United States and some countries of Europe, the carcasses of these animals being left as useless.

Tanning Hides are made into leather by tanning. When taken from the animals at the slaughter-house, the hides are salted to preserve them. If they are to be shipped a long distance, they are also dried. When they are received at the tannery, they are soaked to soften them, and to dissolve the salt. After this has been accomplished, the hides are treated with lime,

which loosens the hair so that it can be removed. When free from the hair, the skins are ready for tanning.

Tanning consists of soaking the raw skins in a liquid made by steeping hemlock or oak bark, or by mixing certain chemicals which have the same properties as these barks, with water. The liquid is placed in a large vat or tank, and the hides are suspended in it. At first they are placed in a weak solution, and as the process continues they are moved from this to successive stronger solutions as they become prepared for the change. The time required for turning raw skins into leather varies according to the kind of skin and the quality of leather desired. Thick, heavy hides of cattle and horses, from which sole leather is made, require a much longer time for tanning than sheepskins or calfskins. The best quality of leather is also made by a slow process which requires several months, and in some cases, even a year, before it is completed.

The varieties of leather are due to the skin from which they are made, the method of tanning and the style of finish. The thick portions of the hides, which are along the sides and back, are used for sole leather which requires no further finish after it is tanned, but the leather used for the uppers of shoes and for various other purposes is usually colored. The coloring is put on after the process of tanning is finished. Most leather used for boots and shoes is colored black, though various shades of brown, and even red, are occasionally found. Morocco, cordovan, Russia and other fancy varieties are usually all made from sheepskin, and take their names from the different styles of finish.

Uses The most extensive use of leather is for the manufacture of boots and shoes. The uppers of men's shoes are made from calfskin and goatskin, also other leather obtained from the hides of young cattle. The uppers of women's shoes are usually goatskin or sheepskin, according to the grade of shoe. Other

important uses of leather are for harness, belting for machinery, upholstering furniture, the manufacture of gloves and mittens, and book-binding.

The United States is the leading country of the world in the manufacture of leather, both in quantity and the quality of its product. Its tanneries produce enough to supply all home markets, and also to enable them to export large quantities. This requires more hides than can be obtained from the meat-packing industry in our own country, and the balance is supplied from the countries of South America, mostly from the Argentine Republic. Our annual output of leather exceeds \$500,000,000 in value.

BOOTS AND SHOES.

In the days of our forefathers, all boots and shoes were made by hand. Each shoemaker performed all the labor necessary to complete the shoes, and this method of manufacture continued until long after the Revolutionary War. For years it was customary for the shoemaker to travel from house to house with his kit of tools and make up the leather into such footwear as the family needed. When the country became more densely populated, the shoemaker found it to his advantage to remain in one location and have his customers come to him. So the shoemakers built small shops, in each of which one or possibly two men worked.

The development of the boot and shoe industry, from these early stages to its present condition, is of great interest because it shows more clearly than the growth of any other industry, what has been accomplished through the division of labor and specializing the occupations of workmen. It is considered that the boot and shoe industry is the most perfectly organized of any manufacturing industry in the country. This evolution had its beginning in the city of Lynn, Mass., which has always been the most important center of the industry. There were many small shoe

shops in Lynn in each of which all the processes necessary to the manufacture of boots and shoes were carried on. Several of the proprietors of these shops decided that it would be to their advantage to combine and divide the different processes among their workmen so that each man should give his attention to only one of the various processes. Some workmen were set to cutting the patterns from the stock, others to sewing these together and still others to fastening the uppers to the soles. The result of this venture was so satisfactory that large shops soon took the place of the small ones.

MODERN SHOE FACTORY

The modern shoe factory is the result of the application of machinery to the manufacture of boots and shoes. As soon as the sewing machine was adapted to this work, it greatly increased the possibilities of the shoe shops, and this machine has now been adapted to all of the different uses to which a sewing machine can be put in the manufacture of boots and shoes. Some machines sew on the buttons, others make the button-holes and others sew on soles. The invention of other machines has kept pace with the modifications of the sewing machines, so that now almost every process required to produce a shoe is performed by machinery. The only work done by hand is cutting the patterns and fastening the uppers to the lasts.

The rapidity of the work is surprising to one not acquainted with a highly specialized industry. Each operative in the factory does but one thing and, consequently, acquires great skill and dexterity. Following the processes, as the parts of the shoe leave the cutting room, one needs to give very close attention to the changes which these parts undergo as they move from one machine to another and from one room to another. So quickly can the work be done that it has been proven that a pair of shoes can be cut, made and finished, ready for wear, in less than twenty minutes,

When finished, the cheaper grades of shoes are packed in large wooden boxes called cases, while the better grades are wrapped in tissue paper and packed in small boxes, a pair to a box. These are then placed in large wooden cases for shipping. Factories usually deal with wholesale merchants only, and the boots and shoes reach the trade by passing from the wholesale dealer to the retail merchant, and from him to the customers. Shoe factories turn out all the way from 1,000 to 10,000 pairs of shoes a day, according to their size and the style of shoes made. Factories which make women's shoes do not usually make shoes for men, as special machinery is necessary for each kind.

Along with the advent of machinery has come a remarkable improvement in styles as well as in manufacture. The hand-made boots and shoes of former days were heavy and often clumsy. Possibly they were more durable than those now placed on the market, but they were also more uncomfortable. The modern shoe is light and artistic in both form and color. New styles are constantly being invented, and they call for new styles in leather and for more machinery; a good illustration that progress in one industry leads to progress in others.

Massachusetts is the leading state in the manufacture of boots and shoes, but the industry is more generally scattered over the country than the textile industry. Large factories are now found in nearly all the important cities of the Union, and through the Central and Western States occasional factories are seen in small towns. St. Louis is the largest center for the West, and her output now equals that of Lynn. As in the manufacture of leather, the United States leads the world in its production of boots and shoes, both as to quantity and quality. Our annual output exceeds 220,000,000 pairs, which is nearly three pairs to every man, woman and child in the country, and the value is some over \$260,000,000; about \$5,500,000 worth are exported,

QUESTIONS.

Why are so few fur-bearing animals found in this country? Name those which are the most valuable.

How are so many different varieties of leather made from the same kind of skins, as sheepskin?

What has driven the old-style shoe-shop out of existence?

Where are the most important centers of shoe manufacturing?

Why do the United States manufacture so many more boots and shoes than any other country?

CHAPTER XV.

PRINTING AND PUBLISHING.

Printing has, more than any other industry, contributed to human advancement. It has been the means of preserving the wisdom of the past, and scattering it abroad in the present. At the same time it has kept mankind informed of the world's progress from day to day. Printing is related to every other industry, and without it, business methods now in general use would have to be abandoned. The merchant could not advertise his wares, the farmer his produce, nor the manufacturer his goods. Without printing, business men could not read of the state of the markets on their way to the office in the morning, nor learn of the day's transactions as they return from their labors. Printing also increases the general intelligence of a people, and this leads to a multiplicity of needs that continually create demands for new products. From every point of view, we find printing to be the handmaid of all industries, and no account of our industrial and commercial life is complete without a sketch of the publishing business.

Printing and publishing are directly connected with the manufacture of paper, the making of printing-presses, of type and type-setting machines, and the manufacture of printers' supplies. While each of these industries is in itself of considerable importance, those connected with the manufacture of paper and printing machinery are the most extensive.

PAPER Paper was originally made from rags, and all the labor was performed by hand. The rags were reduced to a pulp by pounding and grinding them in water. Then the pulp was dipped from tanks with a mold which had a wire screen in its

bottom, and a low rim around the edges. This mold was square and just the size of the sheet of paper. As the workman dipped up the pulp, he gently shook the mold and distributed it evenly over the wire. The water was drained out and a piece of felt was laid over the pulp, and the mold was turned over so that the pulp came out on the upturned surface of the felt. It was then pressed and dried until it became a sheet of paper. The paper made in this way was uneven and rough, but it was the only kind made in the American colonies for many years, and however elaborate the machinery of the present paper-mill may be, the work which it does is in all respects similar to that performed in the old-style mill by hand labor.

Paper can be made from almost any fibrous material except wool. The very finest qualities are made from linen and cotton rags. The larger the proportion of rags, the better the quality of the paper, but most of that now in general use contains only a small proportion of rags, the balance of the material being wood. Newspaper is made entirely of wood, the best quality of the book paper contains only a small proportion of wood, and the higher grades of stationery none at all. Wrapping paper is made of jute, hemp and old rope, but may contain wood pulp and rags.

The paper industry of the United States is one of great importance, and the amount of paper used is almost beyond comprehension. If the wood used, in one year, for the manufacture of pulp were placed together in the form of a cube, it would make a pile 634 feet high, which is more than twice the height of the Masonic Temple, in Chicago, or the highest office building in New York City. The length and breadth of this pile are such as would make it exceed in area the largest city block, while if to this were added the bales of rags, rope and other material used, they would make another cube nearly as large.

If we could combine into one all the rolls of paper used in

printing newspaper for a year, the roll would be 450 feet long, and 225 feet in diameter. This would be twice the size of the largest grain elevator ever built. The newspaper used in the form of sheets, if piled together, would exceed in size the largest city block. Even the stationery used in the country for a year would make a block 427 feet long, 267 feet wide and 56 feet high; while if to this were added the wrapping paper, we would increase the amount by a roll 475 feet long and 237 feet in diameter. The United States consumes every year nearly two million cords of wood in the manufacture of paper pulp.

All paper is now made by machinery, and from the time the raw material goes to the mill, until the finished product is placed upon the market, the hand labor which it requires is only such as may be necessary in adjusting machinery, and in the occasional transfer of the material from one place to another in the factory. The largest paper mills in the country are at Holyoke, Mass.; other large mills are found in New York and the Eastern states. These mills however are more generally given to the manufacture of high grades of paper. The mills which manufacture paper from wood pulp are located near the sources of raw material, and we find very large establishments in the vicinity of the pineries in Michigan and Wisconsin. These mills are given almost entirely to the manufacture of newspaper and book paper.

THE PRINTING PRESS

There has been as great development in printing, as in the manufacture of paper. The first printing-press in the United States was set up in Harvard University at Cambridge, in 1639. This was a primitive machine, and had but very few improvements over the press upon which Guttenberg, the inventor of printing, performed his first work, two centuries before. The growth of the printing industry in the country is well illustrated by the development that has followed the introduction of this small press into Cambridge.

This press was the beginning of what is now known as the University Press, one of the largest and best equipped printing and book-making establishments in America, if not in the world. The first cylinder printing-press was used in London in 1814, for printing the *London Times*, but the greatest development of this useful machine was made by Mr. Richard Hoe of New York City, who in 1840 invented the press which was the original pattern of those now in use for printing the large daily papers.

Mr. Hoe's press put the type on the cylinder, and was so arranged that it printed several sheets at once. Stereotyped plates are now used on these presses, in place of the type, and are so made that each plate covers half a cylinder. By means of these plates the presses can be operated with great speed, and print both sides of the paper at once. Patterns of this press now in use have been brought to such a degree of perfection that a single machine will print, cut and fold 150,000 copies of a sixteen-page paper an hour. The paper is run from the roll, and passes through the press at the rate of about thirty-five miles an hour.

TYPE SETTING. There has been as great a development in type-setting or composition, as in printing. Until a few years ago all type was set by hand, but now in all large establishments most of it is set by machinery. Type-setting machines enable one operator to do what it would require five or six compositors to accomplish in the same time. By their use the cost of printing has been greatly reduced, and the present daily paper has been made possible. The rapidity with which this work can be done enables the publishers of large dailies to delay composition until a much later hour than was possible when all type had to be set by hand. As a result of this the papers contain later information than would formerly be possible. The latest market reports and other important commercial information is now found in every daily paper of value.

LOCATION While all of the large printing and publishing establishments are found in our largest cities, every small city and town of importance has one or more printing offices. In fact, there is scarcely a spot in the entire country that does not have its local press. Perhaps printing is more generally distributed over the country than any other industry except agriculture.

The printing and publishing interests of our country involve a great amount of capital, and give employment to thousands of men and women. The value of our annual output of paper is about \$127,333,000. To get the entire value of this industry we would have to add to this amount the cost of the printing-presses, typesetting machines and printers' supplies used each year. When all these things are taken into consideration, we find that printing and publishing constitute one of the great industries of the country. While many of the commercial methods connected with this industry are somewhat different from those of the other manufactures we have mentioned, yet the intimate relation which the printing-press bears to all phases of American life makes it one of the most important factors in our country's prosperity.

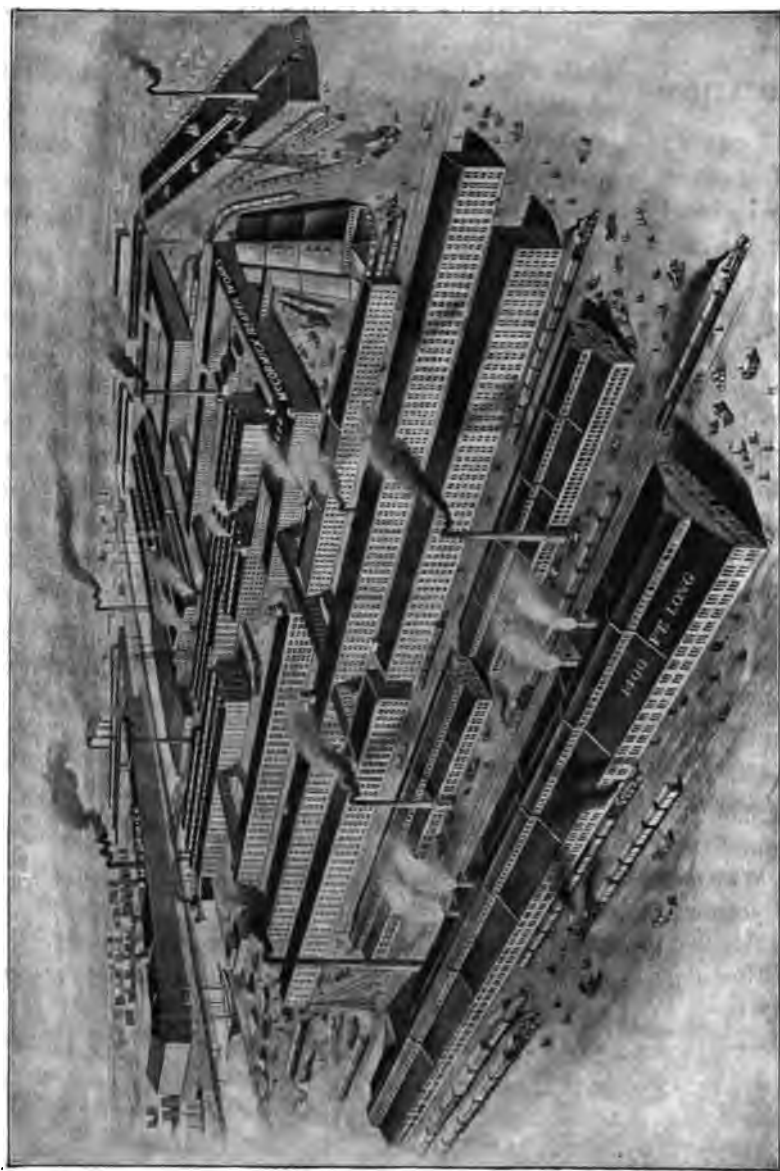
QUESTIONS.

Show how printing has contributed so much to the progress of civilization.

Why are books and newspapers so much cheaper now than they were fifty years ago?

How are the great city dailies printed?

How do you account for the location of a printing-press in almost every small town in the country?



MCCORMICK HARVESTER WORKS OF THE INTERNATIONAL HARVESTER COMPANY, CHICAGO.

CHAPTER XVI.

OTHER INDUSTRIES.

To describe all the manufactures of our country would require many volumes the size of this. While those already mentioned are among the largest and most important, there are scores of others of such magnitude that they could not be removed from our industrial or commercial life without causing a business stagnation. Some of these deal with large articles and require extensive establishments and much capital, such as the manufacture of agricultural implements and electrical appliances; while others deal with smaller articles and are conducted on a much smaller scale.

AGRICULTURAL IMPLEMENTS

The most important agricultural implements are those for preparing the soil for the seed, such as plows and harrows; those for planting, like planters and seeders; those for tilling the soil, such as the various patterns of hoes and cultivators; those used for harvesting, such as the mowing-machine, hayrake and tedder, the harvester and binder and the corn-cutter; and those used for preparing the crops for market, such as the threshing-machine, the corn-sheller or corn-thresher and the cotton-gin. To these must be added the innumerable hand tools, each of which is manufactured in large numbers.

The income from the manufacture of agricultural implements exceeds \$100,000,000 yearly. Illinois is the leading state and Chicago the leading city in the industry. Here are located the works of the great harvester companies which supply most of the country with harvesters and mowers. On account of its lightness, desirability and convenience, American agricultural machinery is

in demand in all of the agricultural countries of Europe and also in South America and Australia.

In 1899, the Department of Agriculture estimated that the inventions and improvements of agricultural machinery since 1860 had caused the following reduction in the cost of producing crops : corn, from 34½ cents to 10½ cents per bushel ; wheat, from 17½ cents to 3½ cents per bushel ; hay, from \$3.06 to \$1.29 per ton. At the present time the amount of human labor, on an average, required to produce a bushel of corn is 41 minutes, and for a bushel of wheat, 10 minutes.

This great saving in the cost of production has made it possible to sell the most important food products at such reduced prices as to bring them within the reach of all of our people. Agricultural implements touch the life of all classes and, directly or indirectly, affect the prosperity of all industries on account of the relation of these industries to agriculture.

ELECTRICAL APPLIANCES

Electricity has become a common agent in our industrial and commercial life. In addition to its oldest uses in the telegraph and telephone and electric light, it is now employed to propel cars and machinery, to separate metals from their ores and in the manufacture of numerous chemical products extensively used in the arts.

The demand for electrical appliances has become so general that their manufacture has created an extensive and important business. Factories for the manufacture of electrical machinery are found in all large cities. New York leads in the industry and Chicago is second, but smaller cities contain factories equally efficient, though operated on a less extensive scale.

SMALL ARTICLES

While the United States is the land of great achievements, and the twentieth century is the day of gigantic enterprises, we must not despise the small things which enter into our daily life. The country contains

numerous industries, which, when compared in value with those already described, are small, yet, on account of their relation to other industries and to commerce, are of such importance that, should any one of them be destroyed, its loss would cause serious inconvenience, both in the United States and several of the countries with which we are carrying on an extensive commerce.

Gloves and Mittens Gloves and mittens are necessary for comfort and ornament. Every year there are manufactured in the country nearly 3,000,000 dozen pairs of leather gloves and mittens, to say nothing of those made of yarn and other material. The largest number is made in the state of New York, which has more factories than all of the other states combined. Illinois, Wisconsin and California are also prominent manufacturers of these articles. Most of the leather used is kid, sheepskin and dogskin.

Rubber Boots and Shoes The adaptation of the gum of the rubber tree to practical use is due to the inventive genius of an American, Mr. Charles Goodyear. After a number of years of trial it is said that Mr. Goodyear made his discovery by accident. The story is, that, after spending several years of his time and all of his property in trying to discover some means of hardening rubber so that it would not be sticky, he was one day engaged in an animated conversation with some friends who were in his shop. Upon a stove near which he stood was a kettle containing some rubber in a melted state, and with which he had mixed some sulphur. In the course of his conversation he upset the kettle and spilled the contents upon the hot stove. When the rubber and sulphur were raised to the required temperature, they united and formed the long sought compound. Mr. Goodyear obtained a patent upon his process in 1844, and the successful manufacture of rubber goods began that year.

Rubber boots and shoes have become a household necessity, and

their use saves thousands of people from exposure and discomfort. The entire value of the output is a little over \$40,000,000 a year. Most of the factories are located in Massachusetts, Connecticut and Rhode Island. Chicago has a number, and there are a few others in different cities. The raw material, or pure rubber, is imported from the Amazon region.

Buttons There are about 240 button factories in the country, and the yearly value of their combined product is some over \$7,500,000, which is quite a fortune to be expended on the production of so small an article. Buttons are made from more than a dozen different materials. The most important of these are agate, bone, glass, horn, vegetable ivory, pearl or shell, and metal, including nickel, steel and brass.

What are known as fresh water pearl buttons are made from the shell of a clam which is found extensively in the Mississippi River and some of its tributaries. In 1890, this industry was unknown in the United States, but now it gives employment to several thousand people, and it has given value to a shell that before was considered worthless. The largest quantity of fresh water pearl buttons is made in the state of Iowa, where the industry started.

Needles and Pins Until the invention of the sewing machine but few needles were made in this country, but the necessity for machine needles led to their manufacture by sewing machine companies, and in time this manufacture was extended to include common needles. England leads the world in the manufacture of needles, and those of the best quality are still imported from that country.

Simple as this little implement is, the process of its manufacture is quite complicated. Even with all of the machinery now in use in their manufacture, every needle passes through the hands of seventy workmen before it is completed.

The pin also is an insignificant article, but one upon whose manufacture a great deal of forethought has been expended. Pins are made by machinery from coils of brass wire. The work is done so rapidly that a continuous stream of pins falls from the machine. Over 30,000,000 are made in the United States in every working day of the year. Before this work was done by machinery, each pin passed, in the course of its manufacture, through the hands of fourteen workmen. Centuries ago, pins were so scarce and so expensive that they were used only by the most wealthy people.

Pencils and Pens Although the use of the typewriter has become almost universal, millions of pencils and pens are used in the country every year. The great factories in which these are produced are in New York, New Jersey and Pennsylvania. The graphite, from which the lead of the pencil is made, is taken from mines near Ticonderoga, N. Y., and the wood for the cases comes from the swamps of Florida. The United States manufactures about one half a million gross a year.

Steel pens are made from cast steel of the best quality. Most of it is imported from England and Sweden. Some over a million gross are manufactured yearly, and to this must be added the gold pens and the various kinds of fountain pens. While England still leads in the manufacture of steel pens, the American factories now nearly supply the needs of our own country.

Time Pieces Most of the clocks of the country are made in Connecticut, and watches in Massachusetts, Illinois and New Jersey. Accuracy and cheapness characterize the American watch. This is because the works are made entirely by machinery and are always exact. The largest watch factory in the world is at Waltham, Massachusetts, and the second in Elgin, Illinois. The Waltham factory alone manufactures more watches

in a year than any other foreign country except Switzerland, its output being 600,000.

Time-pieces are now so common that we scarcely think of their value until deprived of them, but this is because their manufacture has been made so cheap that almost any one who desires may possess a clock or a watch. Before the manufacture of watches by machinery, their expense was so great that but few people could afford to own them.

Waste By-products Some of our most common articles in daily use are made from products that were formerly thrown away as worthless. Soap is made from the waste tissue and fat from the great meat packing houses. Glue comes from the heads and feet of slaughtered animals and some of the most valuable fertilizers are made from the blood and offal.

Formerly, the slag formed in smelting iron was removed from the smelting works at considerable expense and destroyed; but now it is extensively used in making a valuable cement and in the production of paving stones. This industry is much more extensive in Europe than in the United States. The cities of Brussels, Metz and Paris now contain a great deal of pavement made from slag. In England it is manufactured into bricks of a superior quality.

Sawdust has now become an article of value, when only a few years ago it was burned in the rubbish heap, or allowed to float down stream. By a process, discovered by a French cabinet-maker, the sawdust is made into an artificial wood by the use of cement, great pressure and intense heat. The value of this wood is far greater than that of the natural timber. It is hard, strong and capable of taking a high polish, so that the articles made from it are often more beautiful than those made from rosewood or mahogany.

The paper industry originally depended upon rags and waste

rope for its raw material, and it still consumes all of these that can be procured, but the source will not supply the present demand for paper, so that wood pulp and other material have to be added. But the use of these substances should not blind us to the fact that large quantities of rags and waste rope are used by the paper mills of the country.

The iron from old tin cans is fused into steel of good quality. The food waste and garbage of great cities, and even the grease obtained in cleaning wool, are all worked into something of use and value, and the fact that science and invention have made it possible to turn so many of these substances to practical use is one of the greatest importance in our industrial life. In all occupations economy and frugality are necessary to success, and nowhere do we find these virtues practised to a greater degree than in our great industrial enterprises, and this practice is one of the principal reasons for our success as a manufacturing nation.

QUESTIONS.

What has been the influence of agricultural machinery upon the development of the central and western portions of the country?

What agricultural machines have been of the greatest importance in this development?

Where are the largest rubber-shoe factories located? Where do they obtain their raw material?

Why are pins and needles so much cheaper than they were in the days of our forefathers?

Why is a machine-made watch usually a more correct time-keeper than one made by hand?

What common household articles are made from by-products?

PRINCIPAL RAILWAY LINES OF THE UNITED STATES

SCALE OF MILES
0 100 200 300 400 500 600

The map shows a dense network of railway lines across the United States, with major hubs in the Northeast, Midwest, and South. Key cities labeled include New York, Chicago, St. Louis, and San Francisco. The map also shows the Gulf of Mexico, the Atlantic Ocean, and the Pacific Ocean. The title 'PRINCIPAL RAILWAY LINES OF THE UNITED STATES' is prominently displayed at the top. A scale of miles is provided in the top left corner, ranging from 0 to 600 miles. The map is oriented with North at the top.

Don. F. Cram, Eng. Chicago.

CHAPTER XVII.

TRADE ROUTES.

ROADS When the country was new, all merchandise transported overland was carried on the backs of men or animals, and by boat whenever possible. The old overland trade route, in many instances, followed the most important Indian trails. These were located with reference to the ease and safety with which they could be traversed, or to their convenience in leading from one place to another.

The Indian trails became bridle paths, which joined neighboring settlements, and, as the country developed, these routes broadened into wagon roads. Previous to the Revolution, roads, over which stage wagons made regular trips, connected New York and Philadelphia; others connected Boston with some of the more important towns in Connecticut, and these towns with New York. However, but little attention was given to road making until after the war for independence.

Road making in the United States has not kept pace with the commercial development of the country on account of the vast extent of our territory and the rapid settlement of new states. In the older states the principal roads are fairly good, but in those west of New York and south of the Ohio River the roads are entirely inadequate to the demands made upon them. In all of these states there are but a few miles of stone road, and in certain seasons the dirt roads are well nigh impassable on account of mud. The growth of the country and the rapid development of our commercial interests make good roads a necessity to all agricultural communities, and both the national and state governments are now



A RAILROAD LOUP IN THE ROCKY MOUNTAINS

making efforts to improve the public highways. In the present condition of the roads it often costs the farmer more to haul his produce to the railway than it does to ship it from the nearest railway station in the interior to the coast.

RAILROADS

Railroads are the greatest overland trade routes of the country. Beginning with the construction of the Baltimore & Ohio and the Delaware & Hudson Canal Roads in 1830 and 1832, they have gradually extended their lines until now railways are found in nearly every habitable portion of the land. The first railway lines followed the river valleys, and for many years it was not thought possible to construct a railroad through mountainous, or even hilly regions, but the science of engineering has now overcome all difficulties; impassable mountains are tunnelled, rivers and lakes are bridged, and a railroad can be constructed wherever it is desired, provided the company is willing to pay the cost.

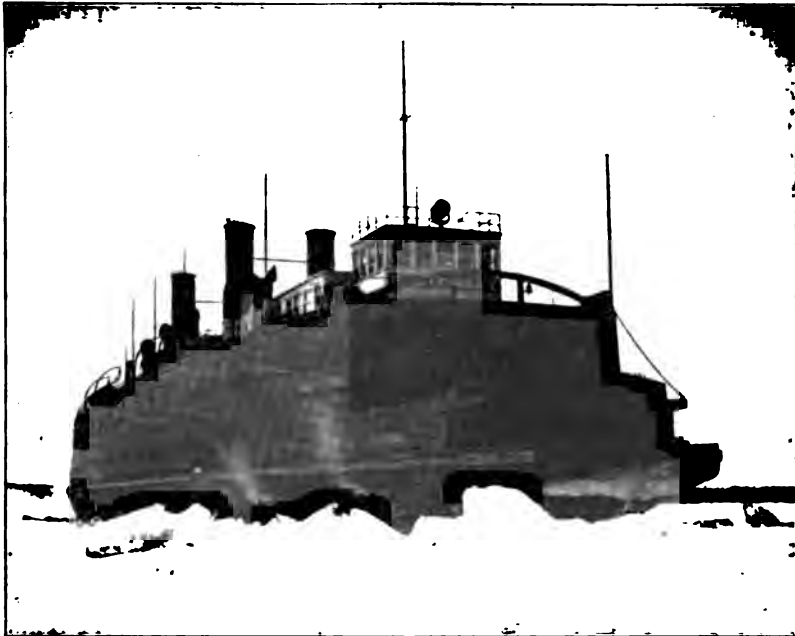
We should notice here that tunnelling a mountain or bridging a stream has the same effect as removing these obstructions, as far as transportation is concerned. The most important tunnel of this sort is the Hoosac Tunnel in Massachusetts, which is some over four miles in length. Numerous others of greater or less length are found in the Appalachian and Rocky Mountains. The great rivers of the United States and Canada are now bridged in numerous places. Some of the most noted of these bridges are the Eads Bridge, crossing the Mississippi at St. Louis; the railway bridges crossing the Ohio at Cairo, Ill., and Louisville, Ky.; the steel-arch bridge across the Niagara River at Niagara Falls and the great cantilever bridge at the same place. Numerous other important bridges also exist, but to enumerate them all would make a list too long for a work of this size.

In numerous places, where, on account of the breadth of the body of water or the danger of obstructing navigation, bridges are



A TRANSCONTINENTAL PASSENGER TRAIN

impracticable, ferry boats are employed to transport trains across. These ferries are large steamboats constructed especially for this purpose, and most of them are capable of carrying from ten to twenty-four cars at once. Some of the most important railway



ICE-CUTTING RAILWAY FERRY

This ferry is 303 feet long and can carry 18 freight cars at a load. It plies between St. Ignace and Mackinaw City, Mich. A special device for cutting the ice enables it to keep the channel open the entire winter.

ferries are those crossing the East River at New York, the Detroit River at Detroit, and Port Huron; those crossing the Ohio River at Cairo, Ill.; those crossing the Straits of Mackinaw between St. Ignace and Mackinaw City, Mich.; and those crossing the bay at San Francisco. The boats crossing the Straits of Mackinaw are

of a peculiar style and are so constructed that they can cut their way through the ice during the winter. One of these boats is the largest railway ferry in the world. There are also a number of ferries plying between Milwaukee and ports on the eastern shore.

The most important lines of railway extend east and west, or nearly so. There are, however, a few exceptions to this general rule. The lines in the northern New England States, and many of those in the Southern States, extend north and south, while the Illinois Central extends from Chicago to New Orleans and forms an important north and south trunk line. This railway has numerous branches extending from Chicago to St. Paul, from Chicago to St. Louis, and numerous shorter lines which connect the main line with other important towns on the Mississippi.

The railways of the United States are naturally grouped according to the extent of their lines and their connections, as follows :

The New England Group The railways of the New England States belong almost entirely to the Boston & Maine, the New York, New Haven & Hartford, the Maine Central and the Grand Trunk Systems. The main lines and branches of these combined systems touch almost every town of importance in the states through which they pass. Their principal connections with western lines are made at Albany, N. Y., New York City and Montreal. The important railway centers in the New England States are Boston, Portland, Springfield, Mass., and New London and Hartford, Conn.

The Central Group The railroads in this group are arranged in two divisions ; those running from eastern points to Chicago, and those running from Chicago westward. The important lines of the first division are the New York Central and Hudson River Railroad running from New York to Buffalo ; and its extensions, the Lake Shore & Michigan Southern and the Michigan

Central, both of which reach from Buffalo to Chicago; the Pennsylvania System, also extending from Buffalo to Chicago, by way of Philadelphia, and having many important branch lines leading to Columbus, Cincinnati, Fort Wayne and numerous other important towns in Ohio and Indiana; the Baltimore & Ohio, extending from New York to Baltimore and Washington, thence westward by the Potomac and Ohio Rivers as far as St. Louis, with a northern line by way of Harrisburg to Chicago. Other important lines in this group are the Wabash & Pacific, the Lake Erie & Western, the Chicago, Cleveland, Cincinnati & St. Louis, usually known as the Big Four.

The important lines of the second division are, the Chicago & Northwestern, with lines extending from Chicago to St. Paul and Minneapolis, from Chicago to Duluth, Chicago to Omaha, and branch lines extending into Iowa and South Dakota; the Chicago, Milwaukee & St. Paul, extending from Chicago to St. Paul by way of Milwaukee, and with important branches running through Northern Illinois, Iowa and Southern Minnesota; also the Chicago, Burlington & Quincy, usually known as the Burlington System. This system has important lines extending from Chicago to St. Paul, and St. Paul to St. Louis, with a line to Denver by way of Kansas City. It will be noticed the roads leading out of Chicago in many instances extend beyond the Mississippi. They form the connection between the roads of the first division in this group and the great trunk lines which extend from the Mississippi and Missouri River points to the Pacific coast.

The most important railway centers in the central group are New York, Albany, Philadelphia, Baltimore, Pittsburg, Buffalo, Cincinnati, Fort Wayne, South Bend, Chicago and St. Louis.

The Western Group This group contains those systems which form the great transcontinental lines, so called because they make connections which reach across the coun-

try, though no one road or single system of roads in the United States has a continuous line from the Atlantic to the Pacific. These lines are, taking them in their order from north to south, the Great Northern and Northern Pacific, which extend from St. Paul and Duluth through Minnesota, North Dakota, Montana and Idaho, to Washington and Oregon points; the Union Pacific, extending from Omaha through Nebraska, Wyoming, Utah and Nevada, to California points; the Atchison, Topeka & Santa Fe, extending from Chicago to San Francisco by way of Colorado, New Mexico and Arizona; and the Chicago, Rock Island & Pacific, which also is a route extending westward from Chicago through Colorado and Arizona to California. Of these, the Union Pacific, now generally known as the Southern Pacific, was the first line constructed, and its completion in 1869 marked the beginning of a new industrial era in the country. All of these great lines have received government aid in their construction, in most cases by large grants of land which the roads have sold to settlers, but in some cases, particularly that of the Union Pacific, by the governments guaranteeing the bonds issued for the construction of the road.

The great railway centers connecting with this group of roads are Chicago, St. Louis, St. Paul and Minneapolis, Omaha, Kansas City, Denver, San Francisco, Portland and Seattle. It will be noticed that Chicago is in the territory on the Central Group, but it is practically the center from which all these great lines radiate and properly belongs with them on account of this relation.

The Southern Group The roads of the southern group are less extensive than those of the others, but most of them are now combined into systems. Among these worthy of mention are the Chesapeake & Ohio, the Queen & Crescent, the Atlantic Coast system, the Louisville & Southern, the Georgia Central and the Illinois Central. The most important of

these lines have direct connections with the lines of the Central Group at Cincinnati, Cairo and St. Louis. The important railway centers are Louisville, Nashville, Atlanta, New Orleans and Jacksonville.

The United States has some over 200,000 miles of railways, which is nearly one-half the mileage of the world. Most of the lines are combined into great systems, each of which is under a single management. The largest of these is the Pennsylvania, which includes some over 10,000 miles of track. Others of importance are the New York Central, the Chicago & Northwestern, the Santa Fe, the Chicago, Milwaukee & St. Paul, the Burlington and each of the great Pacific lines. The combined roads have over 38,000 locomotives, 35,000 passenger cars, and about 1,400,000 freight cars. They carry yearly over 600,000,000 passengers, and more than a billion tons of freight, and employ over a million men. The capacity of the freight cars ranges from thirty to forty tons. The speed of the passenger trains is from forty to fifty miles, with a speed of from sixty to sixty-five miles per hour for some of the fastest express trains. Through freight trains average about thirty miles an hour. The average tariff per mile for passengers is a little less than three cents, and the freight rates are about seventy cents per ton for each hundred miles.

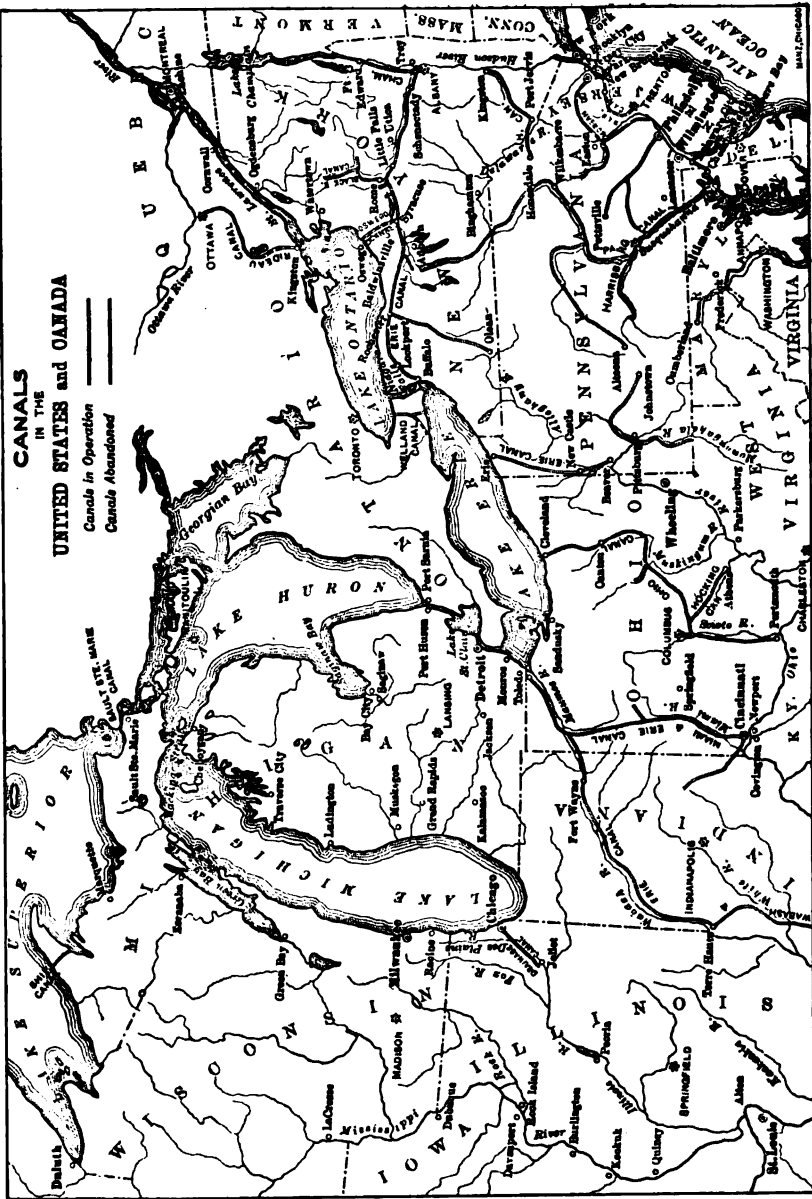
INLAND WATERWAYS

The inland waterways of the United States have an extent of 18,000 miles, about 14,000 miles of which are in navigable rivers and lakes, and about 4,000 miles in canals.

Rivers

The most important navigable rivers belong to the Mississippi system, and are the Mississippi, the Ohio, the Missouri, the Arkansas and the Red, with a few smaller tributaries.

The Mississippi is navigable as far as St. Paul, and between St. Louis and the Gulf has numerous lines of steamers making

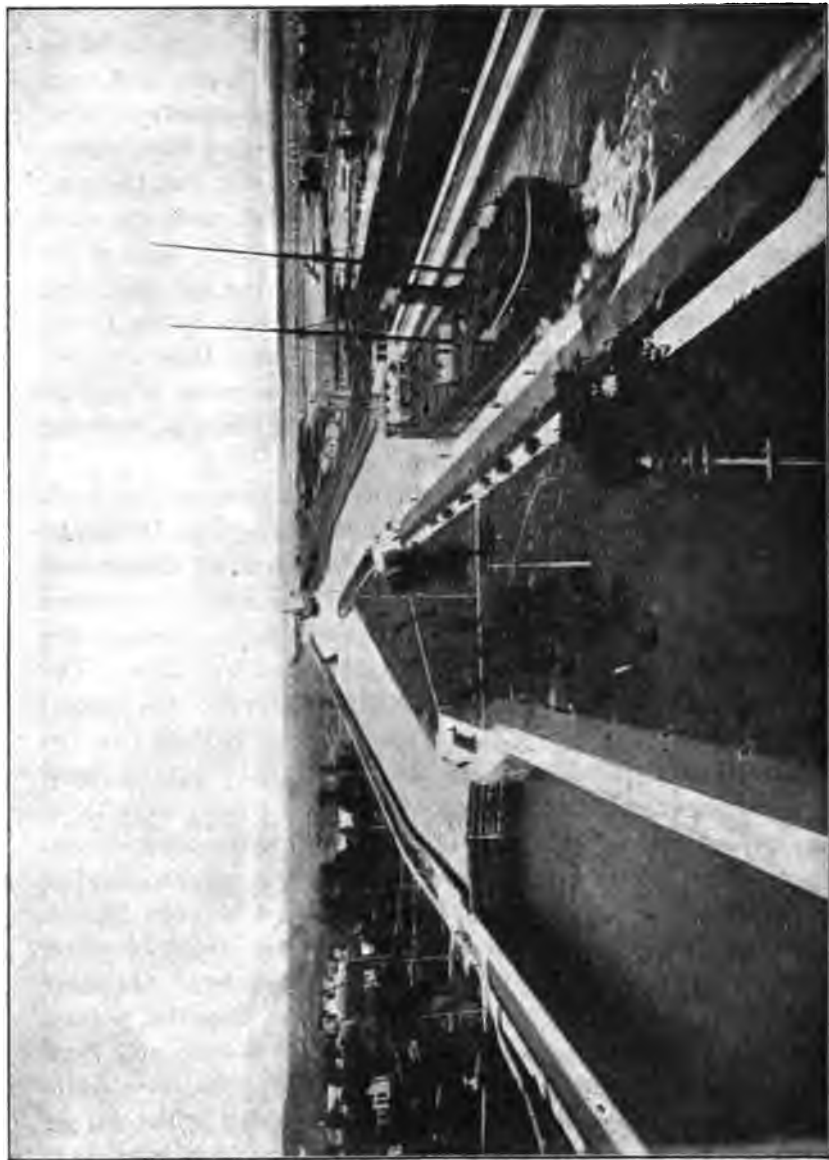


**CANALS
IN THE
UNITED STATES and CANADA**

———— Canals in Operation
———— Canals Abandoned

regular trips throughout the year. The Ohio is navigable as far as Pittsburg, and furnishes a very important outlet for the coal, iron and other heavy products of that part of the country. The Missouri is navigable as far as Fort Benton during high water, and to the mouth of the Yellowstone at other times, but the construction of the western trunk lines of railway has made the navigation of this stream of less importance than formerly. Most of the rivers of the Atlantic Slope are navigable to the fall line, and steamers ascend the Hudson as far as Albany. Navigable rivers afford convenient transportation at lower rates than those charged by the railways and those of the Mississippi system are of special value because of their length and the means they afford of reaching points far removed from the sea coast.

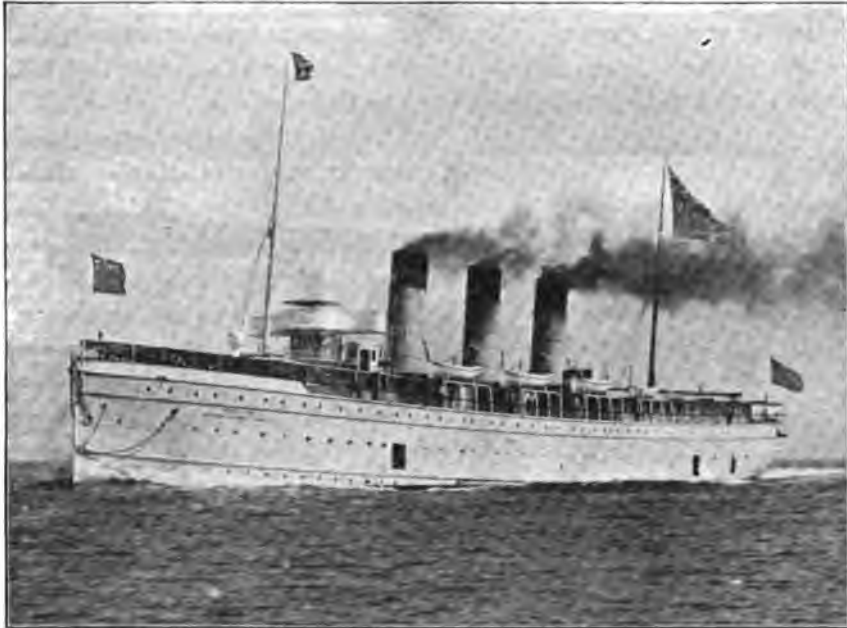
Lakes The most important lake routes are those connected with the Great Lakes. They include routes from Duluth to Lake Huron points, such as Mackinac Island, Port Huron and Detroit, and to Cleveland and Buffalo on Lake Erie; also routes from Chicago, Milwaukee and several Michigan points, through the Straits of Mackinaw to the ports of Lakes Huron and Erie. The railroads of this section have some advantage over the lake routes, because the latter are open to navigation only 225 days in the year, while the railroads are open the year round; but the cheap transportation offered by the lines of steamers plying over these waters gives them an abundance of traffic during the open season. During the season, lake steamers, drawing 20 feet of water, and as large as many ocean steamers, make regular trips between Duluth and Chicago. The best of these boats can make about 14 round trips from the first of May to the first of December. On their downward trips, boats, from Duluth and Lake Superior points, carry cargoes of grain, copper, flour and iron-ore; and from Chicago and Lake Michigan points, grain and merchandise; while on their return trips all boats are usually loaded with coal or



BIRD'S-EYE VIEW OF THE LOCKS AT SAULT STE. MARIE, MICH.

Showing entrance from Lake Superior. The Fox Lock, the largest in the world, is on the right, the Wellston on the left.

merchandise. Some lines carry both freight and passengers and two lines are devoted entirely to passenger traffic. The trip is one of the most delightful in the world.



THE "NORTHWEST," ONE OF THE LARGEST AND FINEST PASSENGER STEAMERS ON THE GREAT LAKES

Canals The lake and river routes are greatly extended by means of systems of canals. Foremost among these is the Erie Canal extending from Buffalo to Albany in New York. This canal was completed in 1825 and was the first great public work undertaken in the United States. It is 363 miles long, 70 feet wide and 7 feet deep. Its opening marked a new era in the industrial and commercial progress of the country. For many

years this canal was the great thoroughfare between New York City and the vast interior, which now comprises the states of Ohio, Indiana and Illinois. It was the construction of the Erie Canal which first gave New York its supremacy as a commercial and financial center, because, after it was opened, foreign ships could obtain at New York cargoes for their return trips and this led them to seek this port in preference to Philadelphia.



The next canal in importance is that at Sault Ste. Marie. This canal makes it possible for the boats to pass from Lake Superior, around the rapids, into the St. Mary's River, and thus reach the lower lakes. It is less than a mile in length and consists almost entirely of canal locks. These are two in number, situated side by side, and have a drop of 18 feet. The largest, called the Poe Lock, is 800 feet in length, 100 feet

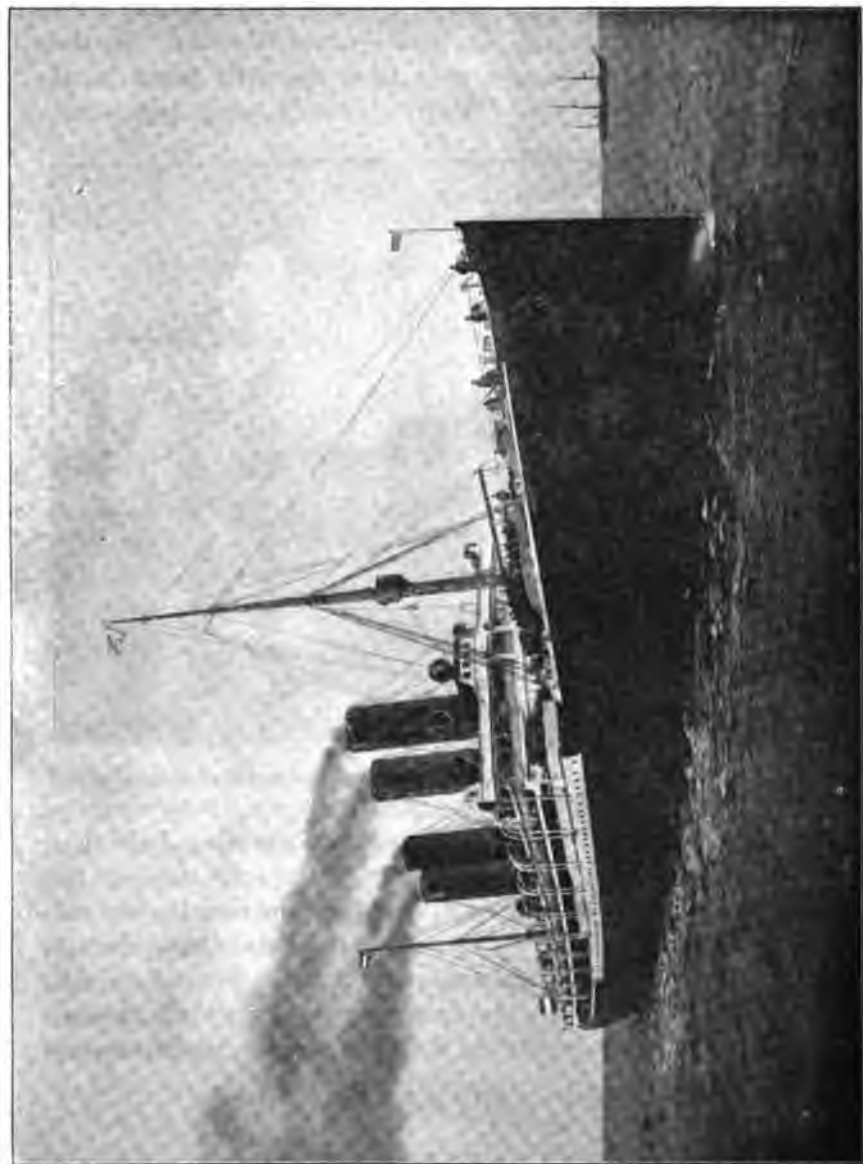
wide, and will admit vessels drawing 20 feet of water. It is the largest canal lock in the world. This is used for the larger boats and the older lock for the smaller ones. Over 25,000 vessels pass through these locks during a season, which is more than six times the number passing through the Suez Canal. The other canals connected with the lake routes are in Canada, but are so closely associated with the traffic of the United States that they really belong to this system of water routes. These are the Welland Canal, which connects Lake Erie with Lake Ontario and passes around the falls in the Niagara River, and the system of canals around the rapids in the St. Lawrence. The combined length of these canals in the St.

Lawrence is about 44 miles, while the total length of the canals between Lake Superior and Montreal is about 70 miles. By their means ocean-going ships can pass from the lake ports to the Atlantic and return without difficulty.

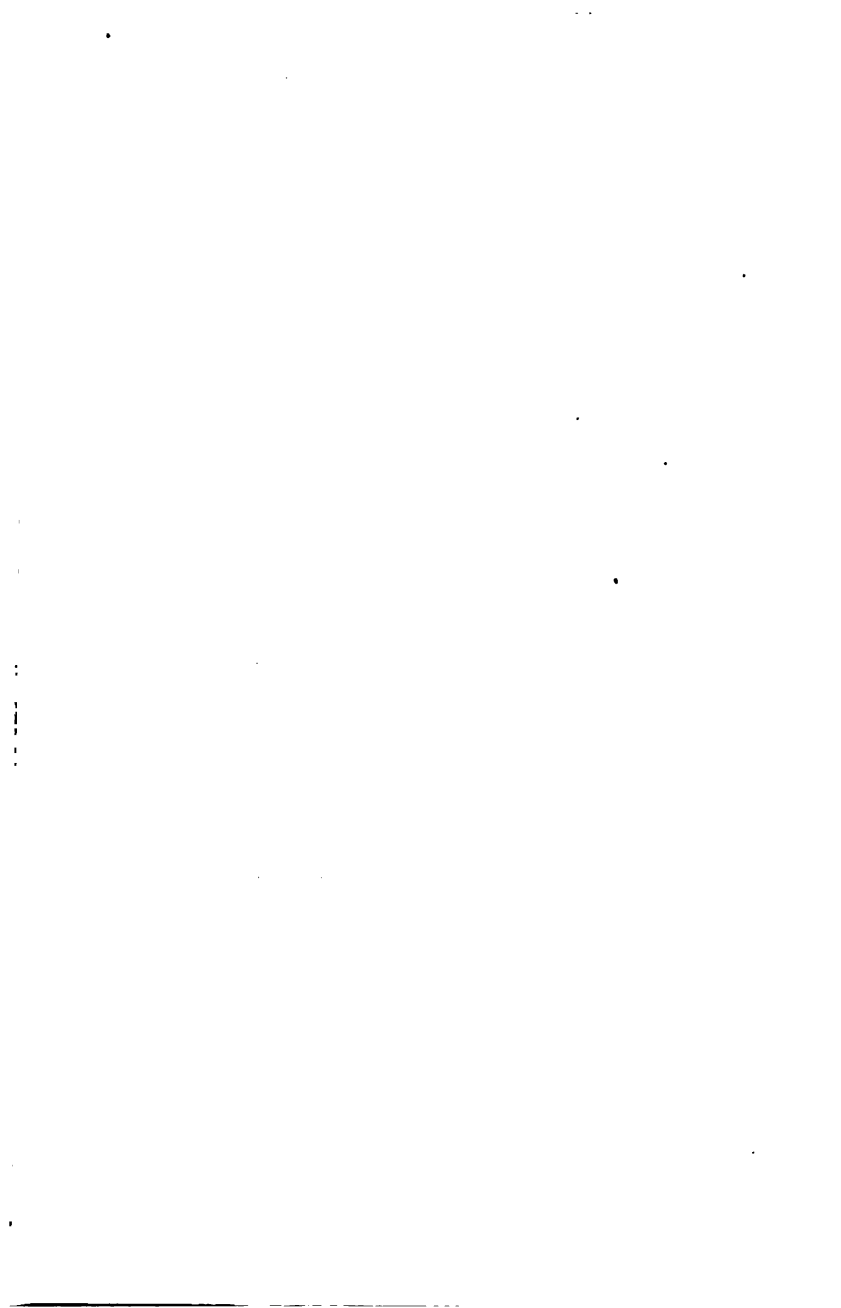


WHALEBACK COMING OUT OF THE POE LOCK AT SAULT ST. MARIE
The power house, containing the machinery for operating the locks, is on the left.

A number of canals were constructed, connecting Lake Erie with the Wabash and Ohio Rivers, passing across the state of Ohio by way of Columbus and Cincinnati; but the numerous lines of railway now traversing that state have rendered them almost useless, except for the carrying of coal and ore. A canal around the falls in the Ohio at Louisville enables boats to pass around this obstruction so that freight can be carried from Pittsburg to the Mississippi without reloading.



THE "KAISER WILHELM DER GROSSE," ONE OF THE LARGEST OCEAN LINERS



Another canal of some importance is that connecting Lake Champlain with the Hudson River. There are a few small canals in Pennsylvania, and the old Chesapeake & Ohio Canal in Maryland is still used for carrying coal, but aside from the Erie Canal, and those connected with the navigation of the St. Lawrence, most of these waterways have fallen into disuse.

The Chicago Drainage Canal, extending from Chicago to the Illinois River at Joliet, though originally constructed for drainage purposes, is of such dimension as to make it navigable for the largest lake steamers. By deepening the Illinois River at various points, and making the proper connection between it and the canal, a direct water route from Lake Michigan to the Gulf of Mexico can be secured, and it is probable that the government will complete this work in the near future.

OCEAN ROUTES The most important Atlantic routes extend from New York, Boston, and Philadelphia to the ports of Europe, and southward along the coast to some of the gulf ports, the West Indies and Central America; while a few vessels go southward around Cape Horn to ports on the Pacific Ocean. These routes are marked on the map, and each should be carefully traced. Vessels going eastward, take a northerly route and avail themselves of the Gulf Stream, escaping the trade winds which blow towards the west; while those vessels going westward, especially sailing vessels, follow the route which is in the path of the trade winds and receive what benefit they can from them on their voyage. However the great ocean liners which make the highest speed between American and European ports, pay but little attention to either winds or currents, but follow the route which covers the shortest distance between ports.

The Pacific routes lead from San Francisco and Seattle to the westward. These extend to the Hawaiian Islands, the Philippine Islands and the ports of China and Japan, while the coastwise

routes extend to the southeast, and reach the ports on the Isthmus of Panama, and the western coast of South America. The annexation of the Hawaiian Islands, the recent development of the Philippines and our increasing trade with China and Japan, are making the Pacific routes more important every year, and when the Panama Canal is completed, numerous steamers, which now cross the Atlantic to reach Asiatic ports, will change to the Pacific route.

COMMUNICATION

Of almost equal importance with the lines of transportation are the means of communication by which business men are kept constantly informed of the industrial conditions and the state of the markets of the entire world. Without the telegraph and the telephone it would be impossible to operate our great railway and steamship lines upon present plans. Telegraph lines now traverse the entire country in all directions, and there is scarcely a hamlet which is not within easy reach of a telegraph office. In addition to this, ocean cables now cross the Atlantic and Pacific, so that it is possible to send a dispatch to any part of the world and receive a reply within a few hours' time. The telephone is more generally used for communication at short distances and saves much time and labor. Telephone lines extend from large cities to surrounding towns, and even to many rural communities, so that these places have a cheap and easy means of communication with the great centers of trade.

In addition to these means of communication, the mails transmit promptly and cheaply letters, bills, receipts, drafts and money orders, and what is of almost equal importance, numerous newspapers and trade journals, by means of which every business man can obtain reliable and very complete information of those lines of commerce in which he is interested. Besides many localities are now favored with free rural delivery, by which means mail is brought daily to every resident along the route. All these advan-

tages improve the farmer's condition from both a commercial and social point of view.

QUESTIONS.

Why was road making so long delayed in the United States? Why are most of our country roads still so poor?

In what general direction did the earliest railroads in the United States extend? In what direction do the longest trunk lines now extend?

Name and locate the important railroad centers in New England? .

What has made Chicago the largest railroad center in the world?

In what way has the government aided in the construction of railroads? Has this aid been beneficial to the country?

Locate and describe the great inland waterways of the United States?

Why did the completion of the Erie Canal form the beginning of a new era in the commercial history of the United States?

What seaports in the United States will have their trade affected by the opening of the Panama Canal?

In what ways does the government aid in transportation?

increased, business was extended, requiring more people, and the settlement became a town. In certain localities, such towns often grew into cities. A number of our small inland cities started in this way.

Water Power Many of the cities of the New England and the North Atlantic States are built on sites where water power is abundant. Such are Lowell and Fall River in Massachusetts; Nashua, N. H., Troy, N. Y., and a number of towns on the fall line; while Minneapolis illustrates the same principle of location in the Mississippi Valley.

Military Stations In our early history, many military posts were established at junction points and portages. These were found to be safe and convenient places for trading stations, and business was drawn to the localities where they were established. When the military was removed, the trading post remained and grew into a town and then to a city. Detroit, Chicago and St. Louis are illustrations of cities that began as military posts.

Mining Pittsburg owes its growth and prosperity to the presence of coal and iron, which made it a convenient and cheap manufacturing center. Added to this was its advantage of being at the head of navigation on the Ohio, which, before the extension of railroads into the interior of the country, gave it prestige as a trading center. Many cities in the coal regions of Pennsylvania, Leadville, Colo., Butte, Mont., and a number of other thriving cities owe their growth to mining interests.

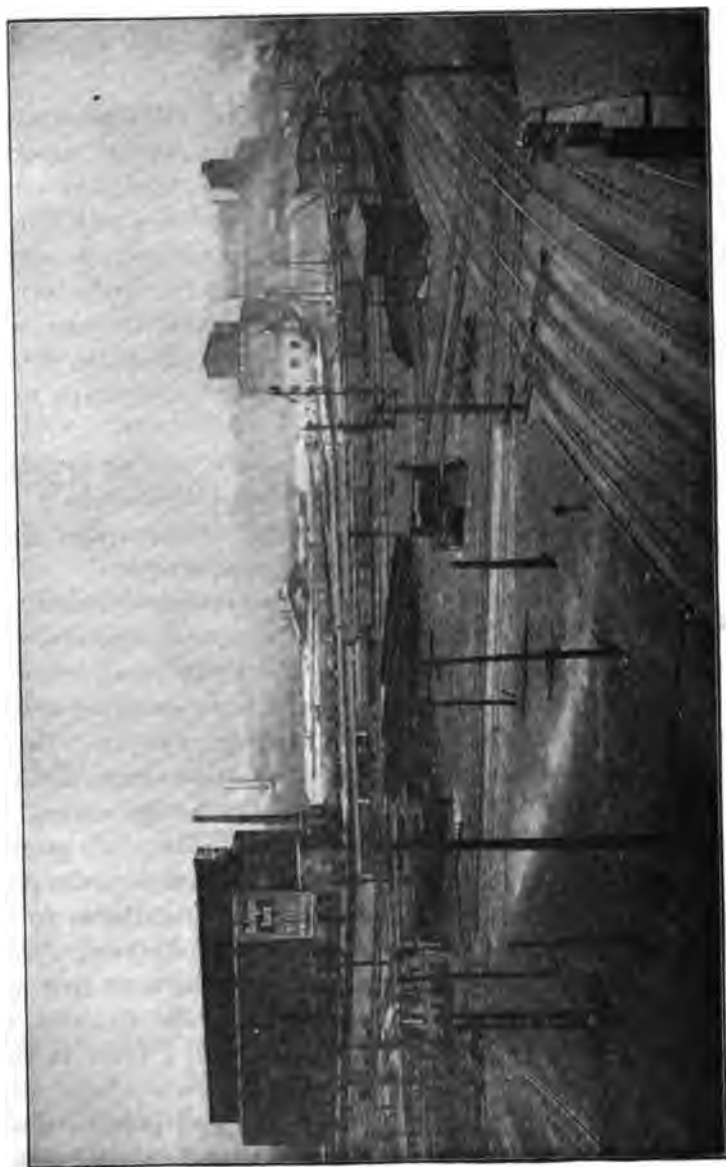
Meeting Places of Land and Water Routes A number of inland cities have grown up at convenient meeting places of land and water routes. Duluth affords the best connection for the railroads of Northern Minnesota and North Dakota with the steamers on the Great Lakes. While Buffalo affords an equally convenient place for

such connection at the lower end of the lakes. Besides, the construction of the Erie Canal early gave this city an important position as a place of trans-shipment of cargoes from lake vessels to the canal boats. Cleveland, Detroit, Milwaukee and Chicago each owe much of their prosperity to similar causes. Numerous lines of railway meet in each of these cities, and the traffic between them and the lake steamers is extensive. New Orleans is an important port for the trans-shipment of cargoes from the Mississippi steamers to ocean-going vessels and from these vessels to the river steamers.

Railway Centers Some inland cities owe their prosperity to the fact that they were located at a convenient point for numerous railways to meet. Indianapolis, South Bend and Denver are good illustrations of such centers.

Other Causes There are a number of other causes which have led to the building of cities at numerous points. St. Paul is at the head of navigation on the Mississippi, and Albany is similarly situated on the Hudson. New Orleans occupies a good site for a river port near the sea. The building of the Eads Bridge transformed East St. Louis from a small town to an important city and railroad center. The construction of a bridge across the Missouri at Kansas City also contributed much to that city's growth. The consolidation of manufacturers and other industries under great corporations that erect extensive factories also contributes to the growth of many cities, and causes the foundation of others. These plants require thousands of workmen, all of whom must live near their work, consequently houses are built near the factories, the wants of the people bring other industries and a town is soon established.

PLAN OF A CITY While each city has its own peculiarities of structure which are determined by its location, in their general plan all American cities are similar.



A NETWORK OF RAILROADS, CHICAGO

Outline The outline of a city is determined almost entirely by its site. Boston occupies land surrounding a very irregular body of water, and has the most irregular outline of any large city in the country. New York originally occupied an island and conformed to its contour, and in its extension has kept its form intact, so that the city is an approximate rectangle, with its greatest length from north to south. Since the west side of the city is bounded by the Hudson, its outline is regular; but the extension of the city eastward is greater in some places than in others, and its eastern boundary is quite irregular. Philadelphia follows the Delaware and Schuylkill, which gives it quite a long extension on the west side. Chicago is a rectangle, with its greatest length on Lake Michigan, and inland cities, whose sites are not affected by bodies of water, are generally regular in outline.

Plan In a great measure the streets of a city must conform to the shape of the site. Cities built upon an irregular site cannot have streets as regularly laid out as others; new cities are more regular than old ones. Philadelphia was the first American city whose streets were properly planned. They run at right angles and are so numbered that the number of any building at once tells its location. This is the proper method of laying out the streets and numbering the lots, and is pursued in all the newer cities of the country.

The modern method of laying out a city is to run the streets at right angles if possible; to name those running in one direction and number the cross streets. Usually an important street through the center of the city is taken as the line from which the numbers extend either north and south or east and west, as the case may be. The blocks are numbered by hundreds; all of the numbers in the first block running from one to one hundred; those in the second from two hundred to three hundred, and so on. By this method, one acquainted with the city can immediately tell the location of

the building. Formerly the lots were numbered in regular order, from end to end of the street, without regard to the number of blocks. Unfortunately in some cities both methods of numbering are in use, which makes it impossible to determine location by number.

Every city is divided into a number of well defined portions, each of which is distinguished by some leading feature. Except in mining towns, the shipping portion is first determined upon. If the city is on a navigable body of water, this is where the most convenient and commodious harbor can be made. In large sea and lake ports it often extends for a long distance along the water front, and where the city is at the mouth of a navigable river, the shipping portion may also extend along both banks for several miles, as in Chicago. If the city is a railway center, the shipping portion is in the locality where commodious railroad yards and freight houses can be most conveniently and economically erected. In large cities the industries often exert a strong influence in locating shipping portions, and instead of one there may be several.

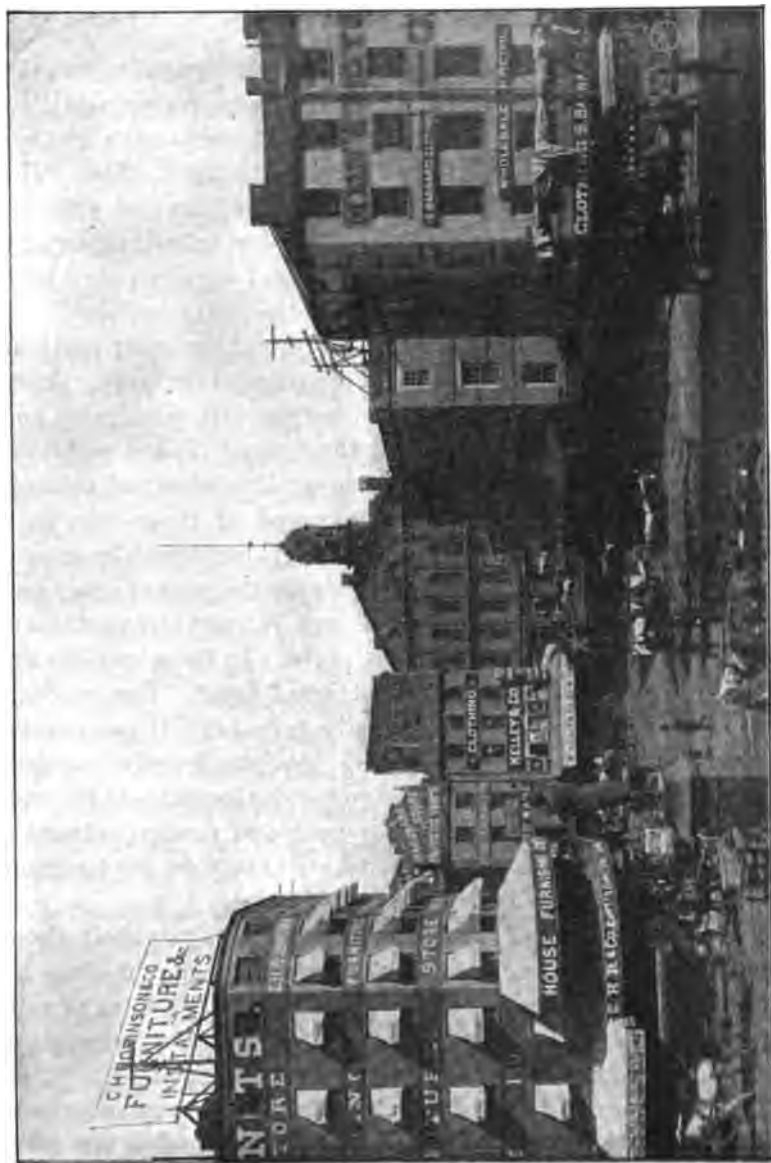
The manufacturing portion is always situated as near the shipping portion as possible, in order to save unnecessary expense in transportation. Cities having an extensive shipping business may have more than one shipping portion, but in such cases, industries of the same sort have a tendency to seek the same locality, therefore we find furniture factories in one locality, boot and shoe factories in another, and iron foundries and machine shops in a third.

As near as possible to the shipping and manufacturing portions is the exchange, or "downtown" portion. This is usually the most important part of the city, and is divided into wholesale and retail districts, the former being near the shipping portion. Here, in addition to the wholesale and retail stores, we find the large office buildings and most of the public edifices, as the post-office, city hall, court house, and such other similar institutions as the city

may contain. In some cities public libraries are located within the business portion, while in others they are in more retired sections. Conveniently located to all business enterprises are found a number of banks, and sometimes a United States sub-treasury office. The buildings in the exchange portion are large, and, in such cities as New York and Chicago, very tall, some of them exceeding twenty stories in height. The streets are broad, and usually paved with granite blocks to enable them to withstand the heavy teaming.

The residence portions are situated around the other portions of the city, and to be desirable should afford good drainage, plenty of sunlight and fresh air, and be interspersed with boulevards and parks. The portions vary widely in these respects, and each portion is sought by the class of people to whose means and tastes it is best suited. Some sections are occupied by those who have acquired great wealth. These sections are characterized by expensive residences, beautiful streets and numerous parks; other sections are occupied by people who, though in good circumstances, do not care to live in so expensive a style. In these sections are many large apartment houses divided into "flats." The portions occupied by the poorer class, are usually quite near, if not within, the manufacturing or exchange centers, and are densely crowded. In such cities as New York and Chicago various localities in the residence portions are occupied wholly by people of foreign extraction who have emigrated to this country and still maintain the language and customs which they used in their fatherland.

The transportation of the inhabitants to and from their places of business always has been a serious problem, and as the cities increase in size it becomes still more perplexing. All lines of railway which center in the large cities run local trains at intervals of a few minutes from the suburbs to their central stations. Street car lines lead from all parts of the city, and from many suburbs to the business portion, and in New York, Chicago and a few other



DOCK SQUARE, BOSTON
 The building in the center of the picture is Faneuil Hall.

cities, these are supplemented by several lines of elevated railway. But during the morning and evening hours all means of transportation are taxed to their utmost. The streets in the business center of every large city become very much overcrowded, and, in order to avoid this, Boston and New York have constructed underground railways, known as subways, which pass under the streets of the most crowded portions. In New York a subway system which can transport over 300,000 passengers a day has been completed, and this to quite an extent relieves the overcrowding.

Nearly every city has one or more parks open to the public as pleasure grounds. Such cities as New York, Chicago and St. Louis have several large parks located in different parts of the city and, in addition to these, numerous small ones so located that they enable the people of the most crowded portions to reach them without traveling a long distance. The schools and churches are usually distributed throughout the residence portions, so as to accommodate the people to the best advantage.

SEAPORTS There are a number of cities on the Atlantic and Pacific coasts that are important seaports.

Among them are :

Boston Next to New York, Boston is our most important seaport. It has one of the best harbors in the country, though it is not as large as that of New York. Previous to the construction of the Erie Canal, Boston was the leading port of the country, but the opening of that waterway gave New York an advantage because it brought to it a large trade that before the construction of railways Boston could not reach. Nearly all of the export and import trade of New England is carried on through Boston and in addition to this, it receives for export a large amount of produce from the west. A number of important lines of railway center in the city, and each has good western connections. Its ocean routes lead to Liverpool, Glasgow, Hamburg and important seaports on

the Mediterranean, while its coastwise trade is very extensive. Boston is one of the great financial centers of the country, and has contributed much of the capital used in establishing cities and industries in the West. Its most important local industries are the manufacture of iron and steel goods, printing and publishing, sugar



POST-OFFICE SQUARE, BOSTON

refining and the manufacture of boots and shoes. It is also the first leather and wool market of the country.

Baltimore Baltimore is situated near the head of Chesapeake Bay, 180 miles from the Atlantic. It has a fine harbor and carries on an extensive export trade. It is the greatest oyster market in the world, and the gathering, canning and

shipping of oysters is one of its most important industries. It is also an important tobacco market and has extensive iron and steel works. In exports it ranks fifth among the cities of the country.

Philadelphia Philadelphia is 100 miles from the ocean, but the Delaware River, upon which it is situated, affords it a good harbor, and the depth of the river is such as to admit of its navigation by large ocean steamers, even at low tide. In the early history of the country this was a much more important commercial center than either New York or Baltimore, but its geographical position was not such as to enable it to maintain its supremacy after the construction of the Erie Canal and numerous lines of railway, which sought New York and Baltimore. Its principal exports are food stuffs, iron and steel, petroleum, coal, cotton, leather goods and woolens. It is an important manufacturing center and its industrial interests greatly exceed those of a commercial nature. It has extensive woolen mills and is the largest carpet manufacturing center in the world. While it is situated on several important lines of railway, they all pass through it and terminate in New York.

New Orleans This is the great seaport for the Gulf of Mexico. Like Philadelphia it is situated on a river more than 100 miles from the sea. At one time, it was thought that New Orleans would become the leading commercial city of the country, but the construction of railways deprived the Mississippi of much of its importance as a commercial highway. The city's most important trade is in cotton, of which it exports large quantities to all of the cities on the Atlantic coast and to Europe. The commercial interests of New Orleans were greatly advanced by the improvement of the mouth of the Mississippi River under the direction of Capt. James B. Eads, who, by the means of jetties caused the current to excavate a channel to a depth of thirty feet, thus allowing the largest ocean-going vessels to reach New Orleans

without difficulty. The city is now developing an important trade with Mexico and the Central American states. It is expected that the completion of the Panama Canal will extend this commerce to the Pacific countries of South America.

San Francisco

This has long been the most important port on the Pacific coast. It is situated on one of the



MARKET STREET, SAN FRANCISCO

finest harbors in the world, which is deep enough to admit the largest vessels regardless of the ebb and flow of the tide. Its thriving commerce is carried on with the ports of China and Japan, and in addition to this it has a greatly increasing trade with Hawaii and the Philippine Islands. Its exports consist largely of wheat-flour, fruits, leather, wines and meat products. Lines of steamers also connect it with most of the Pacific ports of South America, as well as all of the important coast towns of the Pacific

States. It is also the meeting place of several transcontinental lines of railway.

Seattle Seattle, situated on Puget Sound, has an exceptional harbor, and is now the terminus of two transcontinental lines of railway. It is rapidly developing into an important seaport, and has lines of steamers making direct connection with the important cities of China and Japan, and in its trans-Pacific trade reaches eastward as far as Liverpool and London. It is also the headquarters for all the lines of steamers for Alaskan ports. The rapid growth of the business interests of this city during the last decade, has been remarkable, and it bids fair to become the most important commercial port of the Pacific coast. (For a view of the harbor, see page 42.)

LAKE PORTS The commerce of the Great Lakes is carried on between a number of cities that have attained their importance largely on account of this traffic. These are :

Duluth Duluth, situated at the western extremity of Lake Superior, is at the head of the Great Lakes. Though a comparatively young city, it has assumed an important position in the commerce of the country. Extensive ore-docks and grain elevators, from which ore and grain are loaded upon the boats to be taken to ports on the lower lakes are located here. Duluth furnishes a natural lake port for the grain of Northern Minnesota and the Dakotas. Much of the coal and other heavy freight, which is shipped from these regions into the Eastern states, is also sent to Duluth by boat.

Milwaukee This is a city of 300,000 inhabitants, situated on the western shore of Lake Michigan, eighty-five miles north of Chicago. It has extensive iron works, and the largest breweries in the country. Its lake traffic is, next to Chicago, the most important on Lake Michigan. Railroad ferries connect this city with Grand Haven and one or two other towns

on the eastern shore of the lake. It is also an important center for railways running through Wisconsin, and is in the midst of a thriving agricultural country.

Detroit Situated on the Detroit River, Detroit is a convenient stopping place for all boats passing between Lakes Huron and Erie. Upon a large line of boat travel, it is the most important point between Buffalo and Chicago, or Duluth. Many boats pass the river without making the port at Detroit, and it is said that more tonnage passes this city than any other point in the world, notwithstanding the fact that the season of navigation extends through only a portion of the year.

Cleveland Next to Cincinnati, Cleveland is the most important city of Ohio. Situated on the southern shore of Lake Erie, it has an excellent natural harbor and is the center of grain trade and coal and iron-ore shipping. The city also has a number of important manufactories, is a railway center and a convenient shipping port for much of the freight that finds its way from New York, but especially from Pennsylvania, to the ports on the upper lakes. A large portion of the iron-ore from the mines in Minnesota and Wisconsin is transferred from boats to cars at Cleveland. The Ohio Canal connects the city with the Ohio River and affords an important outlet to the Mississippi.

Buffalo The importance of Buffalo at the foot of Lake Erie has already been mentioned. It has an extensive trade, and is the most convenient port for the trans-shipment of goods from lake steamers to the Erie Canal and to railways. The amount of freight brought down the lakes and reshipped from this point gives employment to a large number of people.

RIVER PORTS A few cities located upon the Mississippi and its tributaries are important river ports.

St. Louis This city is situated on the west bank of the Mississippi just below the confluence of the Mis-

souri. It is one of the largest and most important cities in the Union, and now has a population estimated at 700,000. It is the great commercial center of the Mississippi Valley, and is the distributing point for the territory lying to the south and southwest. Next to Chicago, it is the most important city in the interior. Lines of steamers ply between St. Louis and New Orleans throughout the year, and during the summer months the traffic is extended to the northern river ports. It is a great grain and flour market; also handles large quantities of tobacco, cotton, cotton-seed oil and sugar, and contains important glass works, breweries, flour mills and car shops. The city is connected with East St. Louis by the celebrated Eads Bridge, which is one of the most noted of its kind in the world. The erection of this bridge has caused numerous lines of railway to center in East St. Louis, which is a thriving and important suburb, although in another state. The Louisiana Purchase Exposition, held in St. Louis in 1904, greatly increased the city's business during the years of preparation for the Fair.

St. Paul This city is at the head of navigation on the Mississippi, and is the great railway center of the Northwest. It has numerous factories, some flouring mills, and has become an important wholesale and distributing point for the great states lying to the west.

Kansas City This city is on the Missouri River, and is a great railway center. Its river traffic is not as important as that of some cities of smaller size, but its geographical position is such as to make its railway connections far reaching. While contending against natural disadvantages, it has become one of the most important business centers in the central portion of the country. It has a large traffic in live-stock, and in meat-packing ranks next to Chicago.

Cincinnati

This is the most important city in the Ohio Valley, and carries on an extensive river traffic. The Miami

Canal gives it a water connection with Lake Erie, and it also is the center of a number of trunk lines of railway. It has important pork-packing establishments, and extensive manufactories, among them the largest soap factory in the country.

Pittsburg Situated at the junction of the Alleghany and Monongahela Rivers, Pittsburg is practically at the head of navigation on the Ohio. Its position in the center of the coal and iron mines of the region has made it a city of great manufacturing importance. It is also one of the largest shipping points for coal, iron and steel. The leading industries are the manufacture of iron and steel, and glass. The presence of natural gas and its close proximity to the ore fields have enabled Pittsburg to secure an abundance of the most suitable fuel for manufacturing purposes at comparatively little expense, and this advantage has contributed very much to its industrial development.

QUESTIONS.

Why are there so few seaports on the Pacific coast? Account for their location.

What has given Duluth its commercial importance?

Why do similar industries locate near each other in a city? Why would it not be an advantage to have the wholesale and the retail establishments in the same locality?

What has made Boston the most important city of New England?

Why are there no great cities in Iowa, Nebraska or Kansas?

What are the most important industries in each of the following cities: Baltimore, Buffalo, New Orleans, Minneapolis, Providence?

What important cities in the United States have increased in population and wealth because of the building of bridges or canals near them?

CHAPTER XIX.

NEW YORK AND CHICAGO.

New York and Chicago are our two most important commercial and financial centers, and in point of location, plan and other features, follow very closely the general plan of a city outlined in the last chapter. While it would be of interest to describe these cities fully, the purpose of this work will admit of a description of only their commercial and industrial features.

NEW YORK.

LOCATION AND EXTENT New York is the largest city in America, and, after London, the largest in the world. It is located on New York Bay at the mouth of the Hudson. In its outline it is rectangular. Its greatest extent from north to south is about thirty-three miles, its greatest width about fourteen miles, its area is 327 square miles, and its population about 3,500,000. The western boundary follows the Hudson and the Channel to the west of Staten Island and is comparatively regular, but the eastern boundary is very irregular. As now constituted, the city includes New York proper, Brooklyn, Long Island City and Staten Island. For purposes of administration it is divided into five boroughs, as follows: Manhattan, Bronx, Queens, Brooklyn and Richmond. Manhattan coincides with Manhattan Island and is the most densely populated, and contains most of the great financial and commercial establishments.

PLAN The first settlements in New York were made on the southern end of Manhattan Island, where there were good facilities for constructing piers. This determined the



BROADWAY AND FIFTH AVENUE, NEW YORK

shipping portion of the town, and the other portions are in the most convenient, adjacent localities. Good harbor facilities on Long Island caused the village of Brooklyn to be started there.



WASHINGTON BUILDING

The shipper
the
kl

this does not begin to exhaust the frontage. On the west bank of the Hudson, in Jersey City, are other large docks connected with the railways that have their eastern terminals there. The most important of these lines are the Pennsylvania, Baltimore & Ohio and the Erie.

There are a number of manufacturing portions. Some are on the water front in Brooklyn where the great sugar refineries are located; some are in the Borough of Queens, and others are located outside of the city limits in Jersey City and Hoboken. The land adjoining the shipping portion on Manhattan has become too valuable for other purposes to admit of manufacturing in that part of the city.

The exchange portion of New York is crowded into the southern part of Manhattan. Broadway, from Chambers to Tenth Street, is occupied by wholesale houses, as are most of the streets near the docks at the southern end of the Island. The principal retail streets running north and south are Broadway, north of Tenth, Sixth Avenue and the Bowery; and running east and west, Fourteenth, Twenty-third and Forty-second. Broad and Wall streets are the great financial centers, and contain many imposing buildings.

The exchange portion of the city is characterized by magnificent office and public buildings, some of which are twenty-five stories high. Among the most noted of these are the Chamber of Commerce, the Stock Exchange, the Mills Building, the Postoffice and the buildings of the Equitable Life Insurance Company. Another notable structure at the junction of Broadway and Fifth Avenue, is the "Flat Iron," a three-sided building twenty-two stories high.

The residence portions are in the northern part of Manhattan and in Brooklyn, south and east of the shipping and manufacturing portions, and in the Borough of Queens. There are, also, many

beautiful suburbs extending for miles up the Hudson, and others in New Jersey, beyond the business portion of Jersey City.

TRANSPORTATION With her great business interests crowded into the small space that they occupy, the most of the people reside away from the business centers, and the



ELEVATED RAILWAY, NEW YORK

problem of transportation has, for a long time, been a difficult one. Car lines occupy all the principal streets leading north from the business district, and four lines of elevated railway extend from the extreme southern point of the island to the northern limits of the city. An important subway system, connecting Broadway and Fifth Avenue, exceeds twenty miles in extent, and numerous ferries ply between New York proper, Jersey City, Hoboken and

Weehawken, and between New York and Brooklyn on the East River. Two suspension bridges, the Brooklyn and the East River Bridge, connect New York with Brooklyn, and another is in the process of construction. But, with all of these facilities, the crowded condition of the cars and ferries during the "rush" hours, at morning and evening, when people are going to and returning from work, is not equalled in any other city. Tunnels, for electric cars, are now under construction to connect New York with Jersey City, and another system, by the Pennsylvania Railway, is to connect Jersey City with New York and then with Brooklyn. This is the most extensive enterprise of its kind ever attempted in America. When completed, it will admit the trains of the Pennsylvania Railway to each of these cities and save an immense amount of delay and inconvenience. The New York Central & Hudson River Railway enters the city direct from the north.

MANUFACTURES New York is the port through which most of the emigrants pass, and many of them remain in the city; consequently its population contains people from many nationalities. For this reason, there is an abundance of cheap labor, and this is one of the important conditions which determine the variety and character of the city's leading manufactures. New York is the largest manufacturing center in the country, exceeding, by fifty per cent, the manufactures of any other city in America. The manufactures are of great variety, almost everything wanted in a civilized country being made here. The most important industry is the manufacture of clothing, which amounts to over two hundred million dollars a year. A large part of this work is done in tenement houses by cheap labor, in a manner similar to that in European cities, from which many of the workmen came. Other leading industries are the refining of sugar, the manufacture of iron and steel wares, printing and pub-

lishing, malt liquors, various forms of tobacco and cigars, and the roasting and grinding of coffee.

TRADE New York is the greatest commercial center of the Western Hemisphere. The Harbor has over a hundred square miles of anchorage, and nearly 4000 vessels engaged in foreign trade clear from the docks each year. The combined tonnage of this trade exceeds eight million, which is only a little less than that of the foreign trade of London. The coastwise trade is even larger than the foreign, and the two combined make New York the largest seaport in the world. Fifty-five percent of the imports, and nearly three-fifths of the exports of the United States pass through this port.

Steamship lines connect New York with all the important commercial cities of Europe and South America, and with some in Asia. The peculiar location of the city gives it great advantage in export trade and with the great grain states of the Mississippi Valley, since, by means of the Great Lakes, Erie Canal, and Hudson River, freight can be transported from this section by water much more cheaply than by rail. The prestige as a commercial center, which New York acquired soon after the opening of the Erie Canal, also directed lines of railway to it, and its railway traffic has become very large. Besides this, New York is the location of the great stock market of the country, whose daily transactions are measured by millions of dollars.

CHICAGO.

**LOCATION
AND EXTENT** Chicago, next to New York, is the largest city of the country. It is situated on Lake Michigan and the Chicago River. The city is built upon a comparatively low and level tract of land, and extends along the lake front 24 miles from north to south. In width it varies from six to ten miles, and has an area of about 190 square miles.



STATE STREET, CHICAGO
Showing a portion of the great retail district.

Its population is about two millions. The city is divided by the Chicago River into three distinct localities known as the North, West and South Sides. Of these, the South Side is the most important from a commercial and business point of view; it has also the largest population. It is connected with the other districts by three tunnels and numerous bridges.



THE AUDITORIUM BUILDINGS, CHICAGO

PLAN There were no obstacles to laying out a city on the most approved plan, and this has been followed in the building of Chicago. The long streets are parallel to the Lake shore and extend north and south. Some of them, like Western Avenue and Halsted Street, run the entire length of the city. The other streets extend east and west. The system of naming and numbering unfortunately is not uniform throughout the city. In the older part of the town, both north and south, and east and west, streets



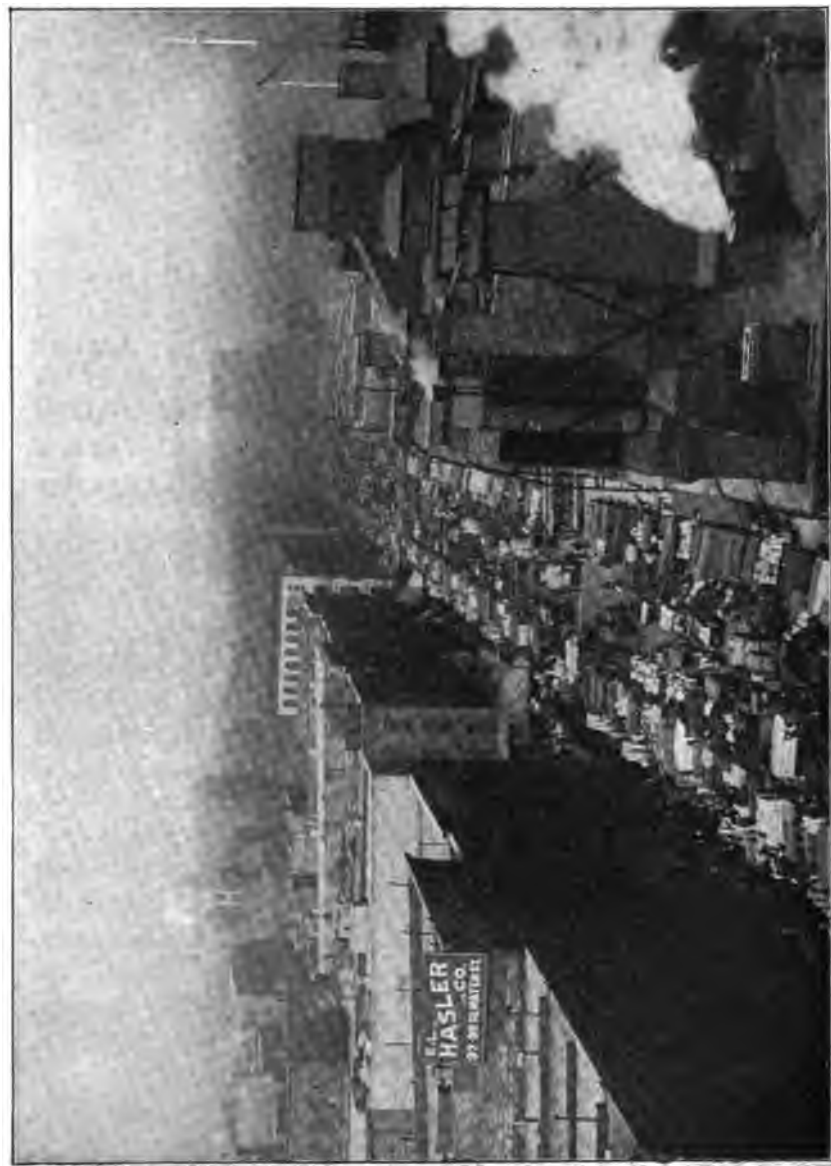
ENTRANCE TO CHICAGO RIVER

are named, but on the south and west sides, south of Twelfth Street, those running east and west are numbered. Much of the north side was originally in separate towns before it became identified with the city, and the old system of street naming still prevails in number of localities.

The shipping portion is on the Lake front near the river, and also extends up the river for some over two miles. Besides the wharves on both banks, numerous others are found on canals that lead from the river to coal docks and manufacturing establishments. Another series of docks is located at South Chicago, near the mouth of the Calumet River. The large railroad yards occupy several localities within the city limits, but are all connected by a belt line, so that freight reaching the city on any line can be transferred to any other without reloading.

Chicago has several manufacturing centers, some being located in each portion of the city. Many factories are located on or near the river, or some of the canals. The great steel mills are in South Chicago near the Calumet. The stock yards, with the great meat-packing houses, are on the South Side, extending along Halsted Street, from Thirty-ninth to Forty-third Streets, and many light manufactories are located on the West Side.

The exchange portion is in the northern end of the South Side, crowded largely between the River and the Lake front, and extending southward as far as Twelfth Street. Within this area are most of the wholesale and retail establishments, the Board of Trade Building, the Federal Building, all of the large bank and office buildings, the Art Institute, the Public Library, the Masonic Temple, the great department stores, the Auditorium and other leading theaters. Some of these office buildings have 6000 occupants. Either in this section, or on the adjoining banks of the River, are the great railway stations, seven in number. Market Street and Fifth Avenue are largely given to the wholesale trade, and South Water



A VIEW ON SOUTH WATER STREET, CHICAGO

Street is occupied by the produce markets, while most of the retail trade centers upon State Street and Wabash Avenue. La Salle Street corresponds to Broad and Wall Streets in New York, as the center of the leading financial institutions.

The residence portions of the city are found in all three of its main divisions, being the largest on the South and West Sides. There are numerous suburbs adjoining each of the main divisions, with which they are connected by railway and street car lines.

TRANSPORTATION The business section of Chicago is congested and the problem of transporting the people to and from their places of residence, is one that has always caused more or less difficulty. A number of the long streets extending north and south are occupied by street railways, and most of the important streets in the west division are similarly equipped. Three tunnels connect these railways with the business district. In addition to these, there are four lines of elevated railway which meet in a loop in the exchange portion, and afford excellent facilities for those living on or near their lines. They extend to each division of the city. There are as yet no subways for passengers, though a system of tunnels for carrying freight is in operation. During the morning and evening hours all transportation lines are badly crowded, but not as much so as in New York.

MANUFACTURES The location of Chicago for manufacturing purposes is very favorable. Her transportation facilities are unequaled, and her proximity to the coal fields of Illinois make fuel abundant and cheap. For this reason, extensive steel works have been located at South Chicago. The great packing houses, which were described in Chapter V, are located in the southern portion of the west division. The great harvester works of the McCormick and Deering Harvester Companies, now consolidated under the name of the International Harvester Company, are also located in the City. Large furniture factories,

piano factories, boot and shoe factories, machine shops, soap factories and numerous other industrial institutions are also found in various parts of the city. The manufacture of clothing is an important industry, the output amounting to nearly \$60,000,000 a year. As in New York, much of this work is done in homes by people who have emigrated from the old countries.

TRADE

Chicago is the distributing center for the vast territory lying to the west and northwest. Her situation on Lake Michigan gives her water communication with the Great Lakes and, through the system of canals on the St. Lawrence, with the Atlantic Ocean. The central location of the city combined with its facilities for Lake transportation, have made it the greatest railway center in the world. Railroads whose aggregate mileage exceeds 120,000 miles, or more than two-thirds of that in the entire United States, center in Chicago, and the freight and passenger traffic in the city is enormous. The harbor is along the Chicago and Calumet Rivers, which have been broadened and deepened for this purpose. The Chicago River has been improved by extending its mouth into the lake and the lake front has, in addition to this, government breakwaters nearly two miles in length. Ships can pass up the Chicago River for a long distance, and many branch channels called slips, have been excavated so as to enable them to reach coal docks and large manufacturing establishments located in various parts of the city. The work of extending these channels is still in progress.

The greatest export trade in Chicago consists of grain, flour, dressed meat and livestock, while her principal import is lumber, the city being one of the largest lumber markets in the world. This is due to the fact that lumber can be brought to this point on the lakes much more cheaply than it can be transported by rail, and from here it is distributed over the various lines of railway to the different parts of the country. Chicago is the greatest wheat

and produce market in the country, and large quantities of grain are received and distributed to other centers. A characteristic feature of the retail trade is the existence of a number of large department stores which seem to have reached perfection of development in this city.

QUESTIONS.

Why is the population in certain parts of New York so dense? Is this true of any other American city?

What causes have made New York such an important manufacturing center?

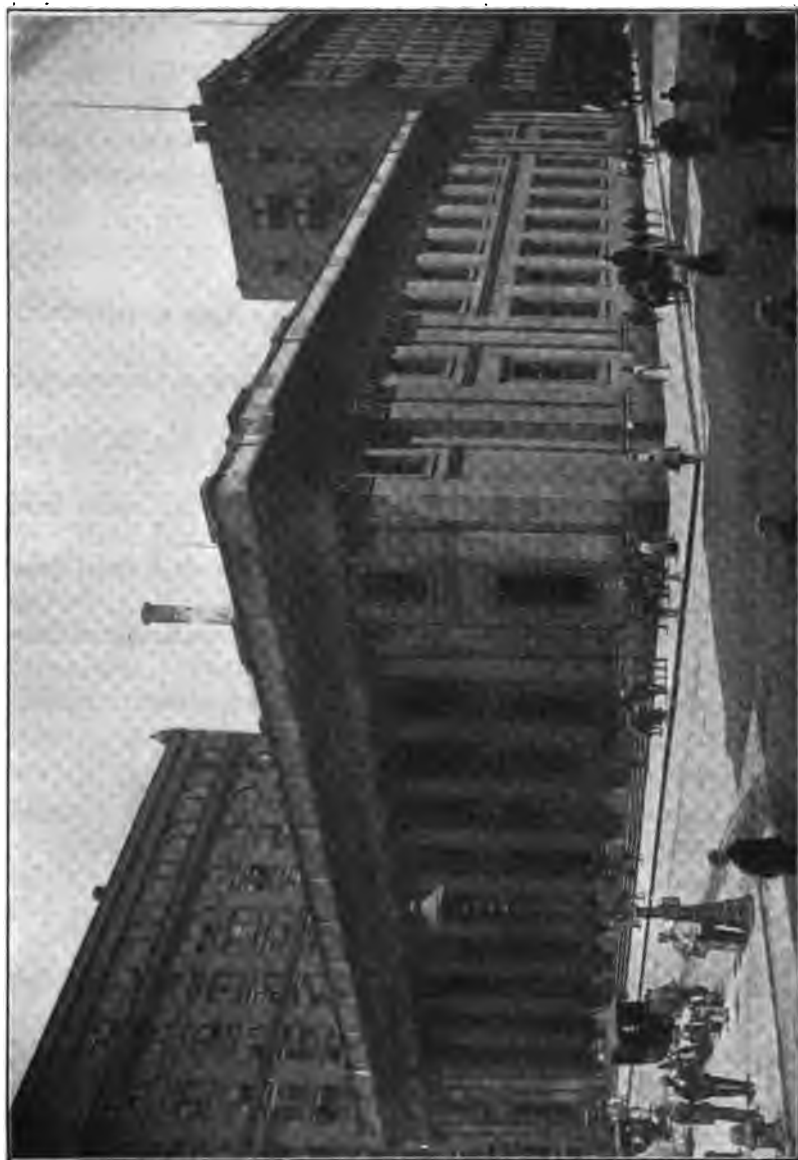
Why is the commerce of New York greater than that of Boston? Why does not Philadelphia have an equally large trade?

What are the reasons for Chicago's location? What causes have contributed to the city's rapid growth?

Why is Chicago a more important railroad center than either New York or St. Louis?

How does the trade of Chicago differ in character from that of New York? What is the reason for this difference?

What makes Chicago an important manufacturing center?



ILLINOIS TRUST AND SAVINGS BANK, CHICAGO

CHAPTER XX.

EXCHANGE.

MONEY We have already learned that men first began to trade by exchanging their products with each other. While the number of products were limited and the wants were few, transactions of this sort were possible, but with the increase in the number of wants and also in the number of commodities this sort of trading became impracticable. The shoemaker could not well go around to the tailor, the farmer and the miller to dispose of his shoes for what each of them produced, and it became necessary for men to have some article which could be used as a uniform medium of exchange. Such an article is known as money. Money is not an institution of civilization, for since the remotest time, barbarians and partially civilized people have used something as a medium of exchange. The Indians used wampum; the tribes of the desert regions in the interior of Africa use salt; the Japanese and Chinese formerly used tea; the Romans used iron; and the early settlers in Virginia used tobacco as a currency.

In order that any medium may be used for money, it must be something that everyone is willing to receive in exchange for what he has to sell. It must have a fixed value; it needs to comprise the value within a comparatively small space, and it must be capable of receiving and retaining stamps which show its valuation. Of all the mediums that have been used for money, gold and silver meet these requirements more nearly than all other materials combined. Paper money is used by the United States and many other nations, but it is of value only so far as it represents gold and silver, for which it may be exchanged at par on the desire of the

holder. The paper money of the United States and of Great Britain is exchangeable at par in all civilized countries. This is because it represents gold.

The money of the United States consists of gold and silver coins, nickel and copper coins, United States treasury notes, gold certificates and silver certificates, both of which are issued by the



A UNITED STATES MINT

general Government, and of the notes issued by the national banks. All of these issues of paper money are protected by specie or bonds, in the possession of the treasurer of the United States. For this reason they never fluctuate in value and are in more general use than the gold and silver which they represent, because they are more convenient to handle and carry.

BANKS A bank is an institution for receiving money and granting loans. If it is a national bank, it also has the

authority to issue paper money to the value of a certain amount of its stock. Banks aid business in the following ways :

First. They serve as safe places in which to deposit money. This is necessary, as but few business men have places where they can keep on hand a sufficient amount of money to transact their business without incurring great risk of loss through robbery or fire.

Second. They cause more money to be used than would otherwise be possible. Many people who deposit money in the bank do not have a sufficient amount over and above their needs to admit of loaning it, but when many small amounts are gathered through these deposits, the bank can loan them in large sums. In this way the bank makes useful money that without such an opportunity would lie idle.

Third. Banks enable many payments to be made without the direct use of money. If A buys of B merchandise to the amount of \$100, and both A and B deposit their money in the same bank, A, by writing an order on the bank to pay B \$100, causes that amount to be charged to his account and credited to B on the books of the bank. The debt is paid, and no money has been handled. This may be equally true if A lives in Chicago and B in New York. That is, A may obtain from his bank in Chicago an order on some bank in New York to pay B the desired amount. B deposits this order in the bank where he does business, and the amount is placed to his credit. Again no money has been handled, but the debt is paid. If signed by the depositor, the order is called a *check*; when made by one bank on another and signed by the cashier or other officer, it is called a *draft*. Drafts are generally used in making remittances to people at a distance.

THE CLEARING HOUSE Banks receive on deposit the checks, drafts and money offered by their depositors. These may be on the bank in which the deposit is made,

or on a number of other banks, either in the depositor's city or in other cities. The depositor is given credit for the amount which his various checks and drafts represent, and the bank makes settlement with the other banks on which these papers are drawn. In small towns, banks exchange checks with each other and balance their accounts at frequent intervals, if not daily; but in large cities, where there are numerous banks, such a method of procedure would require a great deal of time and labor. To avoid this, a clearing house is established.

The clearing house is an association of banks which combine, under regulations that they agree upon, for the purpose of exchanging checks and balancing their accounts with each other daily. The clearing house is in charge of a manager. Each bank represented has a desk at which a clerk is stationed. At a certain hour in the day — as ten o'clock in the morning — a clerk from each bank appears at the clearing house with checks which that bank has received upon the other banks in the association. These are in separate packages so that the amount which each bank owed to the others is quickly ascertained by the manager. After these packages have been examined, they are distributed to the different clerks. Then the clerks from the various banks pass from desk to desk and exchange checks. If a balance is due, the amount is noted, and it is made payable through the clearing house. In this way all the accounts are checked and balanced in a few minutes, and a great amount of labor and inconvenience is saved.

In addition to this, the banks in the association have uniform regulations in regard to accepting and paying checks. These regulations are to them a protection against fraudulent transactions. There are now some sixty-four clearing houses in the United States. The largest is located in New York, and its transactions are several times the amount of those in any other city; the next largest is in Chicago.

Bank Earnings The question may arise: How can banks afford to receive money and cash checks for their depositors? The banks receive their revenue from the loans which they make. A much larger amount of money is usually deposited than is required to meet the transactions as they occur, from day to day. The law providing for the establishment of banks requires that, in addition to the amount needed for daily use, a certain proportion of the deposits be kept as a reserve fund. All funds over these amounts the bank is allowed to loan on proper security. The interest which it derives from these loans constitutes the revenue it receives for transacting the depositors' business, and the pay is usually ample.

CORPORATIONS Many lines of business require such a large amount of capital that people are seldom found with sufficient means to carry them on singly. The construction and operation of great lines of railway, the building of ships and the erection of iron-mills and large factories are good illustrations of such lines of business. In order to secure the necessary capital, corporations are usually formed. A corporation consists of a number of individuals who associate themselves together for a definite business purpose, and obtain from some state a charter, which is a contract binding them to certain agreements and restricting them to the lines of business stated in its terms. When such a corporation is organized it can obtain money by selling shares in the business. These are known as *stocks*, and are usually sold in shares of one hundred dollars or fifty dollars. When sold at the rate of dollar for dollar, stocks are at par; if sold for less than their face, they are at discount; if for more, at a premium.

There are two kinds of stock, both of which are often issued by corporations. They are known as common and preferred stock. The preferred stock is that upon which a certain rate of interest is guaranteed regardless of the earnings of the corporation, and the

common stock is not subject to interest, but its holders receive their share of any dividends that the corporation may earn. The issuing of stock is a strictly proper and legal business, so long as the amount issued does not exceed the actual amount paid in ; but the great danger in these corporations is that they will issue many



UNITED STATES SUB-TREASURY, NEW YORK

more shares of stock than the capital of the corporation warrants. All stock over the amount represented by the actual capital is called "watered stock," and its issuance often leads to financial embarrassment.

BONDS

Corporations in need of money for establishing a business or for its enlargement, often secure it by

issuing bonds instead of selling their stock. Bonds are usually considered the safer investment for the party making the loan, as they are a mortgage on the property, and if the principal and interest are not paid, the holder of the bonds has the right to proceed against the company. Most of the loans made by railroad corporations are secured in this way, and large manufacturing concerns often secure their creditors in a similar manner.

The corporation is usually managed by a few people who are elected as officers. These consist of a president, secretary and treasurer, and there may be several vice-presidents. The ordinary stockholders seldom have any voice in the management of the concern, and must run the risk of obtaining a dividend on their investment, or of being able to dispose of their stock at as favorable a price as they obtained it, should they desire to transfer their investment to some other enterprise.

THE STOCK EXCHANGE Many stocks and bonds are valuable securities, and are sought by those who have money to invest. For this reason, there are those in all large cities who make a business of buying and selling these securities on commission. Such men are known as stock brokers. In most of these cities there is some place where at a certain hour of the day, stocks and bonds are publicly offered for sale. In the United States such places are known as the Stock Exchange. The leading stock exchange of the United States is in New York. It fixes the market price of securities for the entire United States, and transacts more business than all of the other stock exchanges of the country combined. It is located on Wall Street and has attained a world wide reputation.

BOARDS OF TRADE Wheat, corn and other grains, are bought and sold in a manner similar to that employed in the buying and selling of stocks. In cities having large transactions in produce, boards of trade are organized. Members

buy and sell these commodities on commission, and for their own profit. Much of this buying and selling in Chicago and a few other large cities, is at public sale. The largest board of trade is in Chicago and it has a similar influence on the prices of produce that the Stock Exchange of New York has upon the prices of stocks and bonds. Its transactions amount to many millions of dollars a year.

In boards of trade and stock exchanges there are always two parties; those who wish to sell, and those who wish to buy. The first party naturally endeavors to keep the prices as high as possible, and to use every opportunity to raise them. For this reason they are known as the "bulls." While those who wish to buy, as naturally endeavor to keep the prices as low as possible and to seek every opportunity to bring them lower. These are called the "bears." Both of these terms are in common use in connection with the public sale of commodities. To "bear" stock or grain, means to attempt to reduce the price; while to "bull" stock or grain means to attempt to raise the price. However strange these terms may seem to one unacquainted with them, a brief explanation shows that they are very appropriate. The bull tosses things with his horns, while the bear pulls them down with his claws.

To the observer who is unacquainted with the method of these organizations, the scene in the Stock Exchange or Board of Trade when business is at its height, is one of the wildest confusion. It would seem that all the men present are shouting at the same time, and each one in a different language. Yet there is order and system in it all, and those who transact the business understand each other thoroughly, so that mistakes seldom occur. Transactions extending into millions of dollars are made in the shortest possible time, and no one who is a member of the organization can retract from an offer that he has made or accepted. Unfortunately some of the transactions partake of a fraudulent nature, as they are

based upon what are known as "futures," which simply means that the buyer and seller are both engaged in transferring commodities which do not exist. However, transactions of this nature form a very small part of the business done.

MAKING REMITTANCES

Means of transmitting money safely are necessary to the transaction of business between parties living at a distance. When one has access to a bank money can be safely transmitted by means of a bank draft. The draft is made payable to the person to whom the debt is due, and can not be collected until endorsed by that person or firm. Therefore it is of no value to one finding or stealing it. Its loss would cause inconvenience, but not actual loss to the sender.

For those who are so situated that they do not have ready access to banks, the United States mails afford safe means of sending money. These are by registered letter and by postal order. In sending by registered letter, the money is placed in the letter and the registering fee is paid by placing the necessary stamp on the letter in addition to the regular postage. For this fee the government keeps a record of the letter every time it changes hands on its journey; also prepares a receipt addressed to the sender, and which must be signed by the person to whom the letter is addressed when it is delivered. This receipt is then returned to the sender who is thus notified of the receipt of the money by the proper party. In registering a letter the government agrees to keep a record of its transmission through the mails and to insure its delivery to the party to whom it is addressed. But the government does not guarantee the sender against loss by theft or the destruction of the letter by accident, hence the registered letter is not the safest method of transmitting money.

In sending money by postal order, the order is purchased at the home office the same as a bank draft. It is issued in duplicate

and made payable to the party to whom the debt is due. One copy is placed in the letter addressed to the person who is to receive the money, and the other is sent by the postmaster to the postmaster in the town where the money is to be paid. When the holder presents his order at the post-office and properly indorses it, he receives his money. By this means only the order is sent through the mails, and the risk of loss is very slight. Express companies also issue similar orders that are equally safe.

One should never send money through the mails in an unregistered letter, since in so doing he runs great risk of losing his remittance.

QUESTIONS.

Why did the Aztecs and Incas not use gold and silver for money, since they had an abundance of these metals?

Why are gold and silver the most suitable metals for money among civilized nations?

How does a bank aid the industries of a locality?

What is a clearing house? Of what advantage are clearing houses in large cities?

Are there any corporations in your locality? In what business are they engaged?

What is the difference between a Board of Trade and a Stock Exchange?

CHAPTER XXI.

TRADE BETWEEN THE STATES.

Trade with other countries is styled foreign commerce, and that within a country, domestic commerce. We have already seen that commerce depends upon the adaptation of each locality to some special line of industry, and upon the taste of individuals in choosing an occupation. When to this we add good facilities for transportation and a sound money system upon which to base credit, the conditions for a large commerce are nearly perfect. In the United States we find these conditions more fully met than in any other country.

LOCAL INDUSTRIES

Our great extent of territory embraces many regions, which, on account of difference in soil, climate and natural resources, are as distinctly separated, industrially, as though they were under different governments. Furthermore, such regions as the cotton belt, the corn belt and the bituminous coal fields are each larger than the country occupied by any of such great powers as France, Germany or Italy. All of these regions sustain a thriving population, whose wants are supplied by exchanging their products for those of other regions.

INDIVIDUALITY

In no other country do the inhabitants include such a variety of people. The population of the United States comprises representatives of all civilized nations, and these, with the native Americans, have developed into a people whose variety of tastes, range of occupations and independence in thought and deed have never been equalled. These conditions have led to a variety of occupations and created a multiplicity of wants,

**TRANSPORTATION
AND CREDIT**

In railways, steamships, lakes, rivers and sea, we do not lack, and nearly every inhabitant is on or near one of these means of communication, though some are greatly embarrassed in transporting their produce, on account of the lack of good roads. Of money we have an ample supply, our system of credit is sound, and all these conditions have combined to build up a domestic commerce such as no other country maintains.

**MOVEMENT OF
COMMODITIES**

The movement of a commodity depends upon where it is produced, where it is needed, and the distribution of population. The older states are the most densely populated, and although the center of population has been moving westward for more than one hundred years, in 1900 it was only a short distance west of Columbus, Indiana. The population of the agricultural regions is less dense than that of manufacturing regions, and that of the mining regions is generally less than that of the agricultural regions. This distribution of population is an important factor in our commercial life.

Grain

The northern half of the Mississippi Valley and the Pacific Slope are the great granaries of the country. From the first region the movement of wheat and corn is eastward to the great centers of trade and manufacture, Chicago, Buffalo, Cleveland, New York, Boston and other eastern cities receiving large supplies, either for local consumption or for trans-shipment. The grain of the Pacific States has a northern or southern movement, or is exported and goes westward to the Orient.

Cotton

Considerable of the cotton raised in the Southern States is now manufactured in the states where it is grown. However, this constitutes only a small part of the crop. Most of the product is sent northward, either for use in the mills of New England or for trans-shipment to Europe,

Livestock Livestock follows the same lines as grain. It is raised or fattened in the grain producing states, whence it finds its way to the densely populated states and cities, to supply them with meat. Some from the Rocky Mountain States goes westward to supply local demands in California, Oregon and Washington, but a good proportion is slaughtered and prepared for export in the great packing houses in Chicago, Omaha and Kansas City.

Manufactures The manufacturing centers send their wares to all regions from which they receive produce, or raw material. New England, the North Atlantic States, and those between the North Atlantic and the Mississippi River comprise the great manufacturing region of the country. There are large manufacturing establishments in Minneapolis, St. Paul, St. Louis and some other cities. West of the Mississippi River manufacturing is not as general as farther east. Consequently all the vast area between this river and the Pacific coast must be partially supplied by the manufactures from the eastern half of the country. And what is true of the West is equally true of the South.

Manufactures, then, in general, move west and south, and in addition to these general movements, there are those of a purely local character which increase the exchange of commodities between neighboring cities having different industries. This branch of trade is also increased by individual taste, as some people prefer goods from one city and some from another, and in order that the wants of all may be supplied, quite a complex exchange of commodities is necessary.

Mineral Fuels Coal and petroleum are in constant demand, and their movement is to all parts of the country, though each section, as far as possible, is supplied with coal from its nearest sources, as the expense of freight on this commodity is great.

Ore The movement of ore is always to the place where it will be milled or smelted. Iron ore seeks the coal regions because it requires a large amount of fuel. Copper ore is reduced at or near the mines because the transportation of the ore is more expensive than the cost of the fuel required to smelt it. The ores of gold, silver and lead, which are usually reduced by combined mechanical and chemical action, are milled at or near the mines, and the metal is shipped to the points where it is desired. In general, the movement of these metals is eastward.

Iron and Steel Iron and steel are used in all parts of the country, and are shipped from the nearest steel mills to the desired localities. The Illinois mills supply most of the demand of the West and Northwest, but those of Pennsylvania and Ohio supply the East and South and the foreign trade.

COASTWISE TRADE Besides the movements described, there is one of great importance on both the Atlantic and the Pacific coast. This is the interchange of commodities between seaports of these respective localities. On the Atlantic and Gulf coast this trade employs numerous lines of steamships plying on Long Island Sound and between Boston and New York, Philadelphia, Baltimore, Charleston, Savannah, Jacksonville, New Orleans, Galveston and a number of other less important seaports. On the Pacific similar lines ply between San Francisco, Seattle, Portland and Tacoma and Vancouver, British Columbia, and also between San Francisco and the ports to the south, principally San Diego and the port for Los Angeles.

The United States has the largest coastwise trade in the world. Its combined tonnage exceeds 3,120,000 tons, four-fifths of which belong to the Atlantic and Gulf coasts. This trade is by law reserved to vessels under the American flag, and the only competition that is offered these lines is that given by the railways. The

river, lake and railway traffic has already been described in the chapter on trade routes.

Complete statistics of domestic commerce are not obtainable, as no record is required of goods not exported or imported, and its extent can only be estimated by the labor and capital required to carry it on. In addition to the ocean going vessels engaged in coastwise traffic, more than 4000 vessels are employed on the 20,000 miles of inland water, lakes and rivers. The railway transportation requires 200,000 miles of railroad lines, which is about one-half of the mileage of the world, thus involving a capital of thirteen billions of dollars, a sum four times greater than the amount of circulating money in the United States. These railway systems earn yearly the enormous sum of \$1,600,000,000 which is more than three times the annual revenue of the national government. In extent, value and variety, the domestic commerce of the United States exceeds that of any other country.

This remarkable development of our commerce is associated with other great movements which are constantly affecting our industrial and social life. One of the most important of these is the gathering of the people into cities. Large cities are, year by year, adding to their number of inhabitants, and small cities are becoming more numerous. In 1790 only 3.35 per cent of the population dwelt in cities of 8000 or more inhabitants; in 1840 the proportion was 8.52 per cent; in 1890 it was 29.20 per cent, and in 1900 it was 33.35 per cent, or a little more than one-third of the entire population of the country. The next important movement is that of immigration. The constant influx of foreigners is so great that it is affecting our social and political institutions, as well as increasing our opportunities for commerce and industry. The more we study our inland trade the more thoroughly are we led to understand that the domestic commerce of the country is intimately related to every phase of our national life.

QUESTIONS.

Why has the United States so large a domestic commerce?

Why is such a large proportion of the produce of the agricultural regions taken to the cities? What do the cities send to the country in return?

What products are shipped in all directions from their sources of supply?

Why do the manufactures of the Eastern States find a market in the West and the South?

CHAPTER XXII.

ALASKA AND OUR ISLAND POSSESSIONS.

ALASKA Alaska has an area of 600,000 square miles, nearly all of which is on or within the Arctic Circle, but owing to the warm current in the Pacific, those portions near the coast have a much milder climate than the latitude of the country would lead us to anticipate. The interior is broken and, in many places, mountainous. Streams traverse the valleys and, south of the Yukon, the hillsides and most of the lowlands are covered with a heavy growth of forests. Though the trees are not so large as those found in the forests of Michigan and Wisconsin, or Oregon and Washington, yet a large proportion are suitable for merchantable lumber, and in due time will undoubtedly constitute an important source of revenue for this locality.

The hardier grains and garden vegetables are grown without difficulty, as far north as the Yukon. The islands extending beyond the Alaskan Peninsula are favorable for stock-raising, and already large ranches have been established on a number of them. Up to the present time, the most important industries of the territory are gold mining and the canning of salmon. The important mines within the territory of the United States are at Juneau and in the vicinity of Nome City, on Seward Peninsula. Gold was discovered at this point in 1898, and since then hundreds of claims in the immediate vicinity have been taken up and worked. The output of gold has averaged over \$8,000,000 per year since the discovery of these mines, and Nome City has become a town of over 25,000 inhabitants, having all the modern conveniences of similar towns in the heart of the country.

Alaska abounds in untold mineral wealth, which has not yet

been developed. Iron, copper and coal have been found in large quantities and only wait for cheap rates of transportation and men to work the mines. In 1904 large marble quarries were opened near Prince of Wales Island and are furnishing the finest marbles ever quarried in North America.

The salmon canning is on and about Kadiak Island, and in the value of its output is about equal to that of the gold mines. No large towns have yet been established in this part of the territory, but Juneau, farther south on the coast, is the center of important mining industries, and now has a population of about 3,000.

Regular lines of steamers ply between all Alaskan ports and Seattle and other cities on Puget Sound during the months when navigation is open, and the United States has established a regular mail service, so that, except during the most severe winter months, all citizens receive mail at regular intervals. Telegraphic communication by way of Dawson is now open to nearly all points in the territory. The population is about 60,000, and the government is that of an unorganized territory, the governor and judges of the court being appointed by the President of the United States, and the territorial officers appointing the minor local officials. The United States mining and land laws have been extended to the territory, and there is every prospect of a rapid increase in settlement, and in the development of its industries.

PORTO RICO This island, one of the most important of the West India group, was acquired from Spain in 1898. It is a little larger than Indiana, having an area of 36,000 square miles, and a population of about 900,000. It is more densely populated than any state except Massachusetts and Rhode Island. About one-third of the inhabitants are negroes and mulattoes. The better class are Spanish creoles, who live in the towns and control the industries and business affairs of the island. About three quarters of the population is rural.

Near the coast the land is low, but it rises as we go into the interior, where it becomes hilly and, in places, even mountainous. The island is within the belt of the trade winds, and the northern part is abundantly watered, consequently the rivers in this part of the island afford acceptable harbors, and render important assistance to commerce.

Most of the island is divided into small farms, all of which are tilled by their owners. On the low slopes and the plains fruit farming is the leading industry; but coffee, tobacco, corn and mountain rice are grown, and coffee has become an important article of export. In the interior cattle are raised on the hill farms, and the largest tobacco plantations are found on the narrow alluvial plains. The two cities of greatest importance are Ponce, having a population of 28,000, and San Juan, with a population of 32,000. San Juan is 1411 miles from New York, with which it maintains regular communication by steamer. Coastwise steamers also ply between the different ports of the island.

Labor is cheap, and the establishment of manufacturing industries would be a great benefit to the people, as it would enable them to obtain better support than is possible under present conditions. Many of the native plants are suitable for textiles and cordage, and these could be manufactured with profit. The annual trade with the United States amounts to about \$20,000,000. Eight millions of this being exports, which consist, in the order of their importance, of coffee, tobacco, honey, cocoanut and molasses. The imports are cotton goods, rice and codfish. The fish comes mostly from Canada, and the trade with other countries amounts to about \$2,000,000 per year. The roads on the island are poor and the railroads few, but the United States Government has commenced the construction of roads between the most important trading centers, and American capital will undoubtedly extend the present railway lines.

The government consists of an executive council composed of a cabinet, the members of which are Americans appointed by the President of the United States; and five Porto Ricans. There is also a lower house, of thirty-five members, who are citizens of the island, and are chosen by popular vote. The governor is a citizen of the United States, and is appointed by the President. While the Porto Ricans are given a franchise and local and city government, they are not recognized as citizens of the United States. An excellent system of schools on the American plan is now in operation, and the number of pupils in attendance is increasing more rapidly than the school facilities will accommodate. Under American rule all conditions on the island are improving.

HAWAII The Hawaiian Islands lie at the crossroads of all great steamship lines of the Pacific. They are eight in number and are situated between 155° and 160° west longitude; have an area of 6740 square miles, a little more than three-fourths that of Massachusetts, and a population somewhat less than 200,000. The climate is salubrious and equable, owing to the influence of the trade winds. The islands are of volcanic origin, and the soil, which has been formed by the disintegration of lava, is very fertile. It has accumulated in the valleys to a great thickness, and here most of the sugar-cane, which is the important crop of the islands, is grown. This industry employs nearly all of the capital and labor. The cane is cultivated on large estates which are owned by stock companies, but nearly all of the citizens of the island own stock in the corporation, so that their prosperity depends upon the condition of the sugar industry. Rice is the next most important crop, and is grown in swamps by Chinese who are not affected by the malarial climate of these localities. Some coffee, pineapples, bananas and vegetables are also grown, though only to supply local needs.

The forests contain many useful trees, but have been nearly

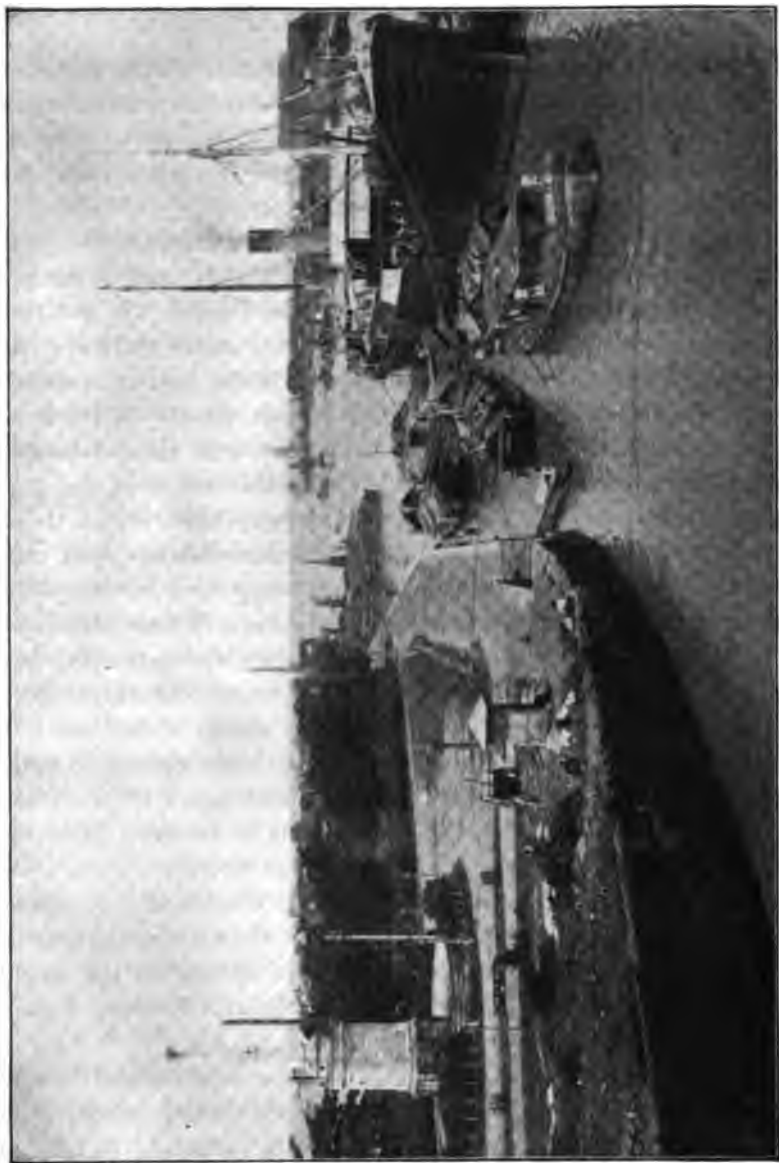
destroyed to secure land for sugar plantations. Cattle and sheep for home consumption are raised in the interior; corn, wheat, rubber, grapes, tobacco and silk worms could be successfully cultivated, but as none of these are as profitable as sugar-cane, they all give way to the sugar industry.

Honolulu on Oahu Island, a city of 40,000 inhabitants, is the most important town. It has an excellent harbor, and is the port of call for the largest steamers crossing the Pacific. It is a thoroughly modern city, having electric lights, street railways, fine buildings and all the improvements found in the best of American cities. The business of the islands is almost wholly in the hands of Americans and Englishmen. The position of these islands is remarkably favorable for commerce, and this accounts for their rapid increase of trade, since more steamers have begun to ply between the United States and the Philippine Islands, and other eastern ports. The islands constitute an organized territory, and have the same form of government as Arizona and New Mexico.

PHILIPPINE ISLANDS

These islands form an archipelago extending from the fourth degree to the twenty-first degree north latitude. Their greatest extent from north to south is about 1500 miles, and from east to west about 650 miles. They lie directly east of the China Sea and north of the Dutch East Indies. The total number of islands is between 1600 and 2000, and their combined area about 115,000 square miles, being equal to that of Michigan and Wisconsin combined. Mindanao and Luzon, the two largest, are each about the size of the state of New York, and are classed among the large islands of the world. The other islands of importance are Samar, Negros, Panay, Palawan, Mindoro, Leyte, Cebu and Bohol.

The interior of the large islands is mountainous and heavily timbered. The forests contain mahogany, ebony, sandal-wood and other valuable timber, and in extent are estimated to have an

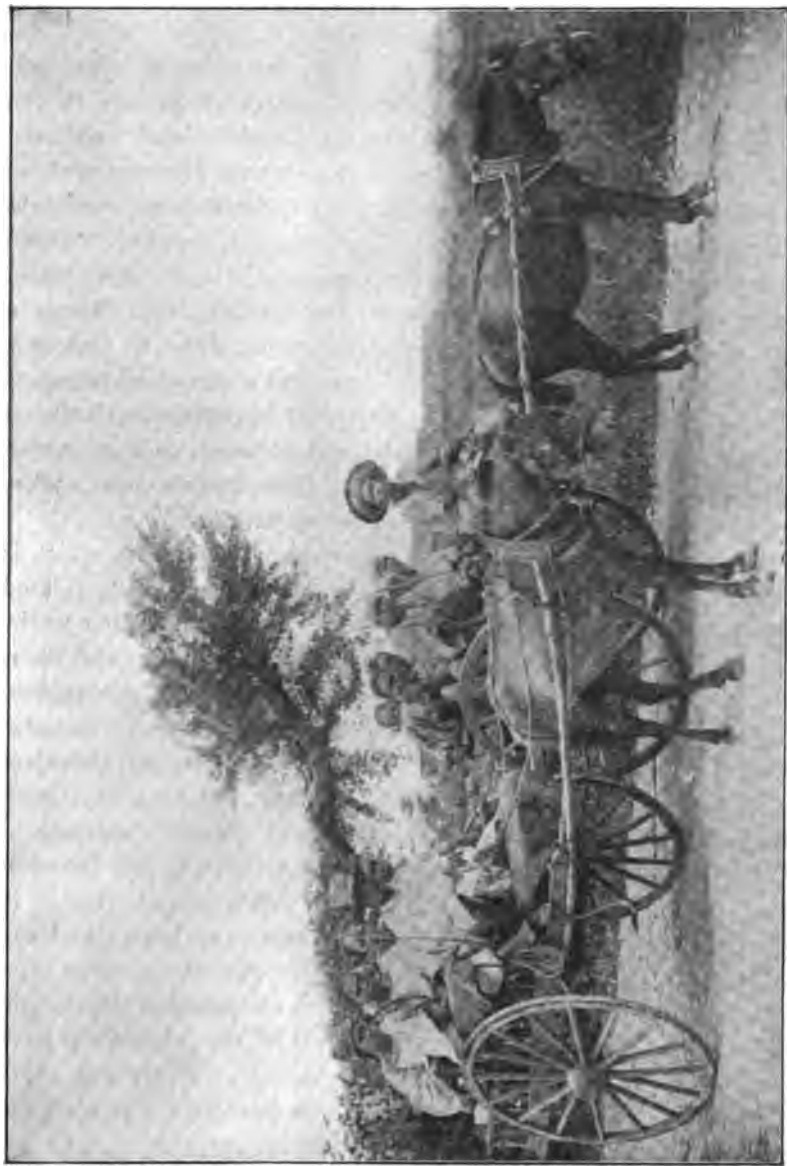


ENTRANCE TO THE PASIG RIVER, MANILA

area of some over 40,000,000 acres. They are of great value, and in due time will become an important source of income to the islands. Fortunately, the forest areas are public land, and have already come under the protection of the national Government, so that the waste that the forests of the United States have been subjected to will be prevented here. The climate is tropical, with an abundance of rainfall. There are three seasons : the dry-temperate, running from November to February ; the dry-hot, from March to May ; and the rainy or wet-temperate, from June to October. The soil is fertile and capable of raising good crops of all products which are suited to the climate. The most important agricultural products at present are sugar, hemp and tobacco, each of which is exported in considerable quantities. Rice, Indian corn, coffee, cacao and indigo are also raised to quite an extent.

The most important article of export is manila hemp, which is the fiber obtained from the leaves of the native tree closely related to the banana and plantain. This is the most valuable fiber in the world for the manufacture of rope, cordage and sacking, and thousands of tons are exported every year. Cocoanuts, pineapples, copra, which is the dried kernel of the cocoanut, and timber are also exported. Some coal is mined on the Island of Cebu and there are also deposits of iron ore, copper and sulphur, but they have been worked only slightly by the natives in a very primitive manner.

The large islands are all connected by telegraph, and the completion of the American-Pacific cable in 1903 placed Manila in direct communication with the United States over lines which are wholly under American control. There are also about seven hundred miles of railroads. The population is estimated at about eight millions, and is of mixed character. Most of the inhabitants have descended from the Negritos and the Malays. There are about 25,000 whites, and 100,000 Chinese on the islands. These are engaged in business, and industrial enterprises.



FILIPINOS GOING TO MARKET IN MANILA

The Philippines contain a number of quite important towns, but Manila is the great commercial and financial center. It is situated on Manila Bay, on the east coast of Luzon, and has one of the finest harbors on the Pacific Ocean. The harbor now has a large anchorage, and is capable of considerable extension by improvement. The city has a population of about 300,000, and is divided into the old and the new town. The old town is enclosed within a wall, and contains a number of substantial public buildings. The principal manufactures are sugar, cigarettes and textiles from the native fibers. This is the seat of government for the islands, and has direct steamer communications with all the important ports on both the east and west coast of the Pacific. Its geographical position is such as to make Manila an important distributing center, and it is destined to become one of the great commercial ports of the East.

Lipa, Batanzas, Buan and Cavite, are cities of about forty thousand each, and all have commercial relations with Manila. Iloilo, on the island of the same name, is the second port of importance, and is the center of a considerable trade in hemp, sugar, tobacco and sapan-wood. Cebu is also a growing commercial port.

The general government is in the hands of a commission appointed by the President of the United States. The head of this commission is styled the governor-general, and is the chief executive for all affairs pertaining to the administration of the islands. Local government, in which the native people have a large share, is now established in all of the large islands. A school system on the American plan has also been established, and is meeting the needs of the people as rapidly as funds for the purpose can be secured. English, Spanish and the native languages are taught in the public schools. The commercial and industrial interests of the islands are growing in value and importance, and with the introduction of manufactures, which American enterprise is bound to

secure in the near future, the prosperity of these islands will be greatly increased.

GUAM This is one of the Ladrone Islands, and was secured by treaty from Spain at the close of the Spanish-American War. It is held only as a strategic point, port of call and coaling station for American ships.

TUITUILA This is a small island of the Samoan group, and was obtained through treaty with Germany and Great Britain. It is of value as a naval and coaling station. The principal town, Pago-Pago, is situated on an excellent harbor. The commercial importance of this island, like that of Guam, is small, but the shipping interests of the United States in the Pacific make this port one of great convenience, and indirectly one of value.

The combined commerce of our island possessions amounts to about \$50,000,000 per year. Since the accession of these islands by the United States the industrial conditions of each group have continued to improve, and with a stable government, and freedom from restraint and unjust taxation which they can now enjoy, they are bound to increase in wealth and importance.

QUESTIONS.

What has led to the recent development of Alaska?

What American seaports are engaged in trade with Alaska? with Hawaii? with the Philippines?

Of what commercial advantage is Porto Rico to the United States?

What is the most valuable product of Hawaii?

What are the means of communication between Hawaii and the United States? between the Philippines and the United States?

With what countries is most of the commerce of the Philippines carried on? What proportion of their trade is with the United States?

What is the United States Government doing to improve the condition of these islands?

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CHAPTER XXIII.

OUR TRADE WITH OTHER NATIONS.

DOMESTIC AND FOREIGN COMMERCE COMPARED

The domestic commerce of every nation is greater than its foreign commerce. As we have already seen, the United States, on account of her great extent of territory, diversity of climate and resources, has an unusually large domestic commerce; and were we compelled so to do, we could supply nearly all of our necessities from our own possessions. But in so doing we should not pursue a wise policy. It is to our advantage to trade with foreign nations for the following reasons :

First. Because many of these nations produce what we can not, as coffee, cacao and rubber; while others produce commodities more cheaply than we can, such as sugar and hemp.

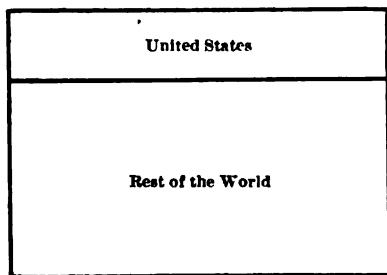
Second. Certain people are naturally better adapted to certain lines of work than others. The French excel in the manufacture of small fancy articles, the Belgians in lace, the Italians in art work and the Germans in toys and scientific apparatus. These people can produce such articles more cheaply than we, even though they did the work no better.

Third. We can produce certain commodities that other nations can not, such as cotton and copper, and we produce many commodities more cheaply or better than other nations can, especially the great food staples, wheat, corn and meat.

Fourth. Interchange of commodities between nations stimulates thought and promotes industry. In all ages commerce has been the greatest promoter of civilization, and nations that refrain

from trading with other nations, or who, unnecessarily, restrict their foreign trade, never take a prominent place among the great powers of the world.

PRINCIPLES The same principles govern foreign commerce as apply to domestic commerce. In our trade at home we patronize those who are most conveniently located, and who otherwise meet our demands most satisfactorily, so in trading with other nations, we have the largest proportion of trade with those who are most conveniently located, and with those with whom our exchange of commodities is best suited to our interests. The exports and imports between nations are seldom equal, and



COMMERCE

the difference in value between these is known as the *balance in trade*. The nation whose exports exceed in value its imports, has a balance of trade in its favor, but the nation whose imports exceed its exports has a balance of trade against it. In the first instance the nation may be called a creditor; in the second it is a debtor.

In our commerce with other nations, in late years, the balance of trade has usually been in our favor.

EXPORTS Our exports are naturally from those commodities that we produce in the largest quantities. The first use of all products is that of home consumption, then the surplus, if any, is sent to foreign markets. For this reason we shall find nearly the same commodities from the United States in all countries with which we have trade, although they vary somewhat in relative proportion. The nations of Europe and Asia use more of our manufactured iron and steel than do those of the tropical regions; while the nations of the tropics use relatively larger

quantities of our cotton goods than the nations of Europe which do their own manufacturing.

While our exports include between seventy and one hundred commodities, those having great value are comparatively few in number. In order of their importance they are, agricultural products, including food produce, raw material and domestic animals; manufactures, including iron and steel, cotton goods, forest products, leather and leather manufactures; petroleum and other oils, and manufactured tobacco. The total value of our exports for the year ending June 30, 1903, exceeded \$1,130,000,000. (As shown by the table on page 272.) Our agricultural implements, tools, machinery and railway appliances are found in nearly every civilized country on the globe; our cotton goods go to all countries except those of Europe and British India, and our boots and shoes have an extensive sale. In relative importance our exports are as follows:

	PER CENT
Agricultural Products	62.73
Manufactures	29.28
Forest Products	4.16
Mining Products	2.81

IMPORTS Our imports are of a more varied character than our exports, since we obtain from each country its principal products which we can secure to our best advantage. From the tropical countries of South America and the West Indies we import coffee, cacao, sugar, rice, tobacco, rubber, cinchona and various other drugs; and from other tropical regions we obtain spices, gums and drugs. Most of our coffee comes from Brazil, and all of our rubber from South America, Central America and Mexico. Raw material in the shape of hides, wool and fiber is also imported from these countries.

From Europe we obtain raw material for manufacturing, such

as iron, yarns and numerous other articles that are partially manufactured. We also import from European countries many manufactured articles, such as woolen and silk goods, ribbons, gloves, scientific apparatus and numerous small articles, like steel pens and cutlery, from England, jewelry from France and art work from Italy.

From China and Japan we obtain most of our tea and raw silk, and from India, tea, certain varieties of cotton goods, Indian rugs, and other manufactures peculiar to that country. From Australia we obtain wool and hides. Our trade with Africa is small, and while American machinery and a few other products are exported in considerable quantities to this continent, our imports from African countries are very light.

The bulk of our foreign trade is carried on with the European nations; The United Kingdom, Germany, France, Belgium and Netherlands in the order named, being the most important. Europe takes about three-fourths of our exports, and furnishes us with about one-half of our imports. Many of the exports to European countries, especially to England, are not used there, but are sent on to Asiatic, African and even South American people. Of the other nations, Canada is the most important in North America, Brazil, Argentina and Chili in South America, and Japan and China in Asia. In the order of their value, our imports are sugar, coffee, chemicals and drugs, hides and skins, cotton goods, iron and steel manufactures, raw silk and silk goods. In their relative proportions they are as follows:

	PER CENT
Raw Material38
Food and Domestic Animals21
Manufactures.	16.79
Luxuries	14.47

TRANSPORTATION

* The map of ocean routes shows that the leading Atlantic ports have numerous lines of

steamers plying between them and Liverpool, Hamburg, Bordeaux and other important European cities, and that San Francisco, Seattle, Portland and Tacoma have important lines of steamers connecting them with the Hawaiian Islands, the ports of Japan and China, the Philippine Islands and Australia.

Unfortunately for the interests of the country, less than one-eighth of our foreign trade is carried in American ships; English, French and German vessels do most of our carrying trade. The manufacturing capacity of the country is now able to produce much more than we can consume at home, and it is to our advantage to seek foreign markets. With an American merchant marine this could be done much more efficiently than is possible under the present conditions. Various measures, such as subsidies and bounties, have been suggested as a means of building up the American merchant marine, but none has yet been adopted. The two principal reasons for the present conditions of American shipping are: the Civil War occurred just at the time when steel ships were replacing those of wood, and all the attention of the country was directed to the war; and since the war we have given so much thought to the development of our internal resources, that the building of ships for foreign trade has been neglected. The European nations were alive to their opportunity, and during these periods secured control of most of the ocean carrying trade. Our merchant marine on the Pacific is increasing since the great transcontinental railways are interested in maintaining lines of steamers between our Pacific ports and those of Asia. Two steamers recently built by the Great Northern Railway Company for this purpose are among the largest freight boats afloat. This line of traffic now controls its own railway and steamship lines from Chicago and St. Louis to the ports in China and Japan and the Philippine Islands, and its carrying trade reaches eastward as far as London and Liverpool.

QUESTIONS.

Why should the domestic commerce of a nation exceed its foreign commerce?

Show how commerce promotes civilization.

Why do we import iron and cotton and woolen goods, when we are constantly exporting these commodities?

With what European ports does New York have direct steamer connections? Does Boston have connection with the same ports?

Why is such a large proportion of our foreign trade carried in the ships of other nations?

What has contributed to the rapid increase of our commerce with China and Japan?

PROPORTION OF EXPORTS FROM THE UNITED STATES TO OTHER COUNTRIES IN THE DIFFERENT CONTINENTS.

CONTINENT	PER CENT
North America	54.38
South America	12.66
Europe	14.48
Asia	4.66
Australasia	11.93
Africa	5.58

PROPORTION OF EXPORTS FROM OTHER COUNTRIES IN THE DIFFERENT CONTINENTS RECEIVED BY THE UNITED STATES.

CONTINENT	PER CENT
North America	50.25
South America	10.97
Europe	44.50
Asia	10.91
Australasia	8.77
Africa	2.24

EXPORTS OF THE UNITED STATES TO THE DIFFERENT COUNTRIES OF THE WORLD.

NORTH AMERICA.

Canada Cotton goods, tools, hardware, agricultural implements, vehicles, sewing machines, furniture, clocks, watches, and shoes.

Mexico Vehicles, hardware, tools, scientific instruments, sewing machines, furniture, books, cotton goods, boots and shoes.

Central America Hardware, wire, tools, flour, cotton goods.

West Indies Cotton goods, agricultural implements, hardware, scientific instruments, tools, sewing machines, vehicles.

SOUTH AMERICA.

United States of Colombia Cotton goods, cotton and sugar machinery, silver plated ware.

Venezuela Hardware, paper, cotton goods, canned goods, flour.

Guiana Shoes, wagons, cotton and linen goods, flour.

Brazil Carriages, hardware, tools, scientific instruments, sewing machines, clocks and watches, cotton goods.

Paraguay and Uruguay Hardware, electric supplies, agricultural implements, varnish, canvas, cordage, cotton goods.

Argentina Agricultural implements, hardware, tools, wagons and carriages, scientific instruments, sewing machines, machinery, cotton goods.

Chile Plows, thrashing machines, locomotives, lamps, cotton goods.

Peru, Ecuador, Bolivia Hardware, cotton goods.

EUROPE.

United Kingdom Agricultural implements, electrical machinery, hardware, vehicles, scientific instruments, typewriters, sewing machines, furniture, boots and shoes, cotton goods, dressed meats.

Germany Agricultural machinery, wagons and carriages, tools, boot and shoe machinery, furniture, typewriters, sewing machines, cotton goods, dressed meats.

France Agricultural implements and tools, sewing machines, scientific instruments, hardware, furniture, bicycles.

Austria Agricultural implements, railway appliances, bicycles, scientific instruments, hardware, pumps, leather goods, cotton goods, flour, beer.

Italy Machinery, hardware, watches and clocks, sewing machines.

Spain and Portugal Hardware, scientific instruments, flour.

Russia Agricultural machinery, locomotives and railway supplies, machinery, hardware, rope, leather goods, rubber.

ASIA.

British India Locomotives, rails, hardware, machinery and tools, bicycles, clocks.

Chinese Empire Hardware, tools, scientific instruments, sewing machines, furniture, cotton goods, canned goods, flour.

Japan Locomotives, railway appliances, tools, bicycles, scientific instruments, machinery, nails, furniture, flour.

Siberia Railway appliances, locomotives, electrical machinery, flour.

AUSTRALIA.

Agricultural machinery, vehicles, hardware, typewriters, sewing machines, tools, scientific instruments, watches and clocks, cotton goods, boots and shoes.

AFRICA.

Mediterranean Countries Flour, dairy products, canned goods, machinery, locomotives and railway appliances, agricultural implements, iron and steel goods, jewelry.

South Africa Agricultural machinery, mining machinery, electrical machinery, railway appliances, bicycles, typewriters, hardware, wagons, clocks and watches, scientific instruments, books, boots and shoes, canned goods.

CHAPTER XXIV.

COMMERCIAL GROWTH OF THE UNITED STATES.

The first census of the United States was taken in 1790. At that time the western boundary of the country was at the Mississippi River, and the area was 827,844 square miles, only a small portion of which was settled, and this constituted a narrow strip of land extending from Maine to Georgia, and from the Atlantic coast to the Appalachian Mountains. Our population was only half a million more than the population of New York City in 1900, and was exceeded in our last census by the population of each of the following states: New York, Philadelphia, Illinois and Ohio. In 1790 there were only three cities that were worthy of the name: Philadelphia, New York and Boston, and these were scarcely more than good-sized villages. There was no such thing in the world as a railroad, a steamboat or a telegraph. Even carriage roads were few, and so poor that they were impassable a good portion of the year. The country possessed only nine hundred postoffices, and the annual receipts of the postal department were about \$281,000. Less than fifty newspapers were published in the entire country.

The nation was burdened with a debt that was equal to \$15.63 per capita. The total amount of coinage was a little over half a million dollars. There were no banks under national supervision, and the value of our manufactures was so small that it did not appear in the census report. The annual revenue of the government was about \$10,849,000. Our imports amounted to \$91,250,000 and our exports to about \$71,000,000, making our entire foreign trade about \$162,250,000.

Our industries had been ruined by a long war; our currency

was worthless, and our credit gone. The only industry at all comparable with those of foreign nations was our carrying trade. We had over 100,000 vessels and two-thirds of our tonnage was engaged in foreign trade. No patents were issued, no immigrants arrived, and the nations predicted the speedy downfall of the new republic.

The condition of the nation at the census of 1900 shows a progress during the intervening period unequalled by that of any other nation in the world's history. From less than three-fourths of a million square miles our territory increased to 3,025,600 square miles, or over three and a half times. From the narrow area occupied by our forefathers at the close of the Revolution, American settlements and institutions have extended more than half the way round the world, and the extent of our Pacific coast line exceeds the distance from New York to San Francisco.

The last census shows that at the beginning of the twentieth century the United States contained over 900 cities of 5,000 or more inhabitants; and that of this number, 159 had a population of 25,000 or more.

The census of 1830 reported twenty-three miles of railway in operation, and that of 1900 reported 194,321 miles, which number has since been increased to over 200,000 miles. We now have over 76,600 postoffices, and the annual receipts of the postoffice department exceed \$102,333,000. In 1790 there were less than fifty newspapers in the country, and in 1900 this number had increased to 22,000. Telegraph messages were not reported until 1870, when they exceeded 9,157,000, and in 1900 this number had increased to over 63,258,000; and in 1903 the number was 91,391,443, an increase of nearly tenfold in thirty years. The first telegraph line was completed in 1844, and extended between Washington and Baltimore, a distance of forty miles. In 1900 the country had over 933,000 miles of lines, and these have now

been extended to exceed 1,100,000 miles. The first public experiment with the telephone was made at the Centennial Exposition in Philadelphia in 1876. In 1903 there were in the country 2,437,700 miles of telephone lines, 1,277,983 stations, and the daily exchanges exceeded 9,333,000.

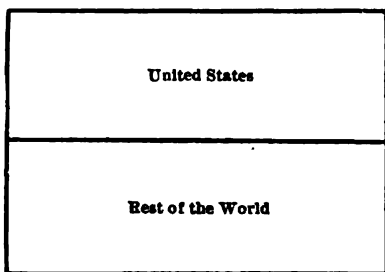
In 1900, the gold and silver coined by the country exceeded \$135,500,000, and the total money in circulation was a little more than \$2,055,000,000, or \$26.93 per capita, which has now been increased to \$29.47. There were 3606 national banks having a total capital of \$608,588,045, and in 1903 this number had been increased to 4700 with a capital of over \$722,750,000, and the bank clearings of the country exceeded \$114,000,000,000. In 1900, the revenue of the Government was \$567,240,852, and the expenditures \$477,553,458. The value of our agricultural products exceeded \$3,750,000,000, and of our manufactures \$13,000,000,000. Our imports amounted to nearly \$850,000,000 and our exports exceeded one and one-third billion; and 26,400 different patents were issued during the year.

The United States began the twentieth century under exceedingly favorable conditions. The period from 1870 to 1900 had witnessed remarkable progress running through all lines of industrial and commercial activity. Our industrial and commercial position in the world is shown by the following comparisons. We produce five-sixths of the cotton, one-sixth of the wool, three-fourths of the corn, one-fifth of the wheat, one-third of the coal, one-fourth of the cattle, one-half of the hogs, a little more than one-third of the iron and steel, two-thirds of the copper, one-fifth of the silver, one-half of the gold, one-half of the tobacco, one-third of the lumber, one-third of the manufactures and one-fourth of the commerce of the world.

In manufactures we lead the world, and our manufactures exceed those of the United Kingdom and Germany combined,

who stand next to us as the two greatest manufacturing nations. We own nearly one-half of the railway mileage and more than one-half of the telegraph and telephone lines of the world. Our total commerce is exceeded only by that of Great Britain, and our trade with foreign countries is steadily increasing.

The geographical position of the United States is such that it is especially favorable for international trade. Situated between



TOBACCO

the two oceans we have equal facilities for trade with the countries of both Europe and Asia, and our position in the Pacific Ocean gives us an excellent opportunity to increase our traffic with this part of the world. There is a widespread interest in industrial and commercial education, and the schools of the country

are each year sending out thousands of young men specially fitted for a business career.

Our greatest hindrances are the lack of training among our consuls and commercial representatives abroad, the unwillingness of the great majority of American manufacturers to study intelligently the needs of foreign countries and to make such goods as the inhabitants of those countries desire. This is especially true of our inability to adapt our manufactures to the wants of the people in tropical countries. We also lack, as already stated, an efficient American merchant marine. Only about 13 per cent of our imports and 7 per cent of our exports are carried in American vessels.

These conditions are not discouraging; for, since our acquisition of the Hawaiian Islands, the Philippines and Porto Rico, and our recent extended relations with other nations, we have begun to

make the necessary preparation for successfully maintaining the new conditions and responsibilities which these additions of territory have forced upon the country; and we have every reason to believe that the United States will continue to maintain the national and commercial prestige with which she began the century. The statement on the following page taken from the Monthly Summary of Commerce and Finance of the department of Commerce and Labor shows the progress of the United States in tabular form.

ITEM	DATE AND VALUE	DATE AND VALUE
Area	(1800) 827,844	(1903) 3,025,600
Population	5,308,483	80,372,000
Population per square mile	6 41	25.56
Circulation of money per capita	\$5.00	\$29.42
Farms and farm property	(1850) \$3,967,343,580	\$20,514,007,888
Farm products	(1870) \$1,958,030,927	\$3,764,177,706
Manufacturing establishments. No.	(1850) 123,025	(1900) 512,784
Value of manufactures	(1903) \$1,019,106,616	\$13,039,279,566
Imports of merchandise	(1800) \$91,252,768	(1904) 991,087,371
Imports per capita	17.19	12 54
Exports of merchandise	\$70,971,780	\$1,451,914,642
Exports per capita	(1903) \$13.37	\$17.32
Production of gold	(1810) \$2,463	\$74,425,340
Silver	(1850) \$150,000	73,106,106
Coal, tons	(1820) 365	(1900) 240,788,238
Petroleum, gals.	(1860) 21,000,000	(1900) 2,661,238,568
Pig iron, tons	(1820) 20,000	(1903) 18,009,252
Wool, lbs.	(1850) 35,802,114	287,450,000
Wheat, bu.	(1840) 84,823 272	637,821,935
Corn, bu.	\$77,531,875	2,244,176,925
Cotton, bales	(1800) 155,556	10,727,559
Cotton exported, lbs.	(1880) 298,459,102	3,543,043,022
Railways operated, miles	(1830) 20	(1903) 199,685
Post-offices, No.	(1800) 903	74,169
Newspapers, No.	(1810) 359	20,485
Immigrants arrived	(1820) 8,385	857,046

PART THREE.

COMMERCE OF FOREIGN NATIONS.

Foreign countries in their trade with the United States and with each other are governed by the principles laid down in the discussion of the commerce of our own country. They buy what they can not produce, or what other countries can produce better or more economically, and sell what they can produce in the largest quantity and to their greatest economical advantage.

CHAPTER I.

CANADA.

Extent and Surface The Dominion of Canada, the most important British colony, occupies all of the mainland of North America north of the United States, with the exception of Alaska. It is a little larger than the United States and a little smaller than Europe. The surface is divided into three great regions: the Eastern Highlands, the Great Central Plain and the Pacific Highlands and coast region. The Central Plain is divided by the V-shaped height of land that passes around Hudson's Bay and forms a low plateau. The Rocky Mountain system forms the natural boundary between Canada and Alaska, and contains some of the loftiest peaks in North America. The country between the two highlands is a vast extent of plains and prairies, and the Eastern Highland region is interspersed with low hills, fertile valleys and mountains which have an altitude somewhat less than the average ranges of the Appalachian system.

Canada lies in the cool temperate and the frigid zones.

Climate The eastern peninsula and the southern portion of Quebec and Ontario have a climate similar to that of New England and New York. The Pacific Coast regions, owing to the warm ocean current, have a mild climate with an equable temperature and abundant rainfall. The Central Plain has a wide range of temperature and slight rainfall. The northern part of the Dominion is too cold to admit of successful agriculture, but the other portions have a favorable climate and a fertile soil, and produce excellent crops of all grains and vegetables adapted to cool temperate regions.

Agriculture Agriculture is the leading industry of Canada. About three-fourths of the people are farmers, and more than one-fourth of the land is suitable for tillage, but a large proportion of this in the interior is still undeveloped. The eastern part of Ontario, in the vicinity of the Great Lakes, is the most fertile region and is called the "Garden of Canada." Cereals, live-stock and fruits are raised here in abundance. Manitoba and the districts between it and the arid region east of the Rocky Mountains constitute the great wheat region. This is a prairie country, having a rich soil underlain by a layer of clay that holds the water near enough to the surface to warrant a good supply for vegetation. As a spring wheat section, this region is even more important than that of Minnesota and the Dakotas, and is destined to become the greatest wheat growing region of the world. Since 1900 this portion of the country has become rapidly settled by emigrants from the United States, the eastern provinces and Europe. Quebec, New Brunswick and Nova Scotia are engaged in diversified farming and in dairying. Butter and cheese of excellent quality are made and Canada has become the largest exporter of cheese in the world.

The principal agricultural exports are wheat, flour, cheese,

butter, live-stock and poultry. Most of the perishable products are sent to England in refrigerator ships.

Lumber The forest areas of Canada extend from Nova Scotia and New Brunswick in an unbroken belt across the country to Alaska, and in British Columbia to the coast and northward to the limit of the tree line. The belt is from two to three hundred miles wide, and is the largest forest area possessed by any lumber producing country. In the eastern section of this belt the principal trees are the red and black spruce, the red and white pine, the balsam fir, the tamarack and hemlock, and in British Columbia the Douglas fir is the chief source of lumber supply. Ottawa is the chief center of the lumber industry, and obtains its supply of timber from the pine forests to the north and northwest. Extensive mills are also found on Parry Sound and Georgian Bay. Most of the lumber of this region is exported to the United States by the way of the Great Lakes. The lumber manufactured in New Brunswick and Nova Scotia finds a market in the New England States. The forests of this region also supply considerable wood pulp and pulp wood. The lumber of Quebec and a portion of that of New Brunswick is exported to England, while the British Columbian mills find a market for their surplus product in trade with the Pacific towns of the United States.

Minerals The mineral resources are only partially developed. Valuable anthracite coal mines are worked in Nova Scotia, and deposits of bituminous coal are found on both the Atlantic and Pacific coasts, but gold is the leading mineral product, the annual output being about \$10,000,000. Most of this comes from the mines in the Klondike region of the Yukon, and those in British Columbia along the Fraser and Columbia Rivers. Mines of less importance are also located in Ontario and Nova Scotia.

Iron-ore is found in Belle Isle, Nova Scotia, in Newfoundland, and in several places in Quebec, but it has not yet been extensively



THE WATER FRONT, MONTREAL.

worked in any of these places. Nickel mines are located at Sudbury, Ontario, and produce one-half of the world's supply of this metal. Native copper is found on the northern shore of Lake Superior, and copper-ore also occurs in Quebec and British Columbia, and has been worked successfully in all these places, but the entire output of copper, compared with that of the United States, is very small. Petroleum and asbestos are also valuable mineral products of these provinces.

FISHERIES The fisheries are one of the most valuable assets of the Dominion. They give employment to about 70,000 men, and yield on an average, an annual income of \$20,000,000. The most extensive part of this industry is along the Atlantic coast. Since foreign vessels are prohibited from fishing within three miles of the shore, in the strip of water inside this limit, the Canadian fishermen find an abundant supply of cod, herring, halibut and lobsters. People of Nova Scotia and New Brunswick are very generally engaged in the taking and curing of fish. The product is exported to the United States, the West Indies and Europe. British Columbia is the source of important salmon fisheries, and about one-fourth of the output of fish in the Dominion comes from this region. The Great Lakes supply white fish, trout and sturgeon. Most of the latter are taken from Lake Huron.

FURS Since the advent of the early French settlers, Canada has been one of the leading fur countries of the world, and the great forests of the interior still furnish a good supply, as nearly every animal of that locality is a fur-bearing animal. Edmonton, in Alberta, is the chief center of this traffic. Here the trappers bring the pelts and exchange them for food, clothing and such other commodities as they may need. The cheaper skins are prepared in Canada or the United States, but the more expensive ones are exported to England. The fur trade is

controlled by the Hudson Bay Company, which, until recently, exercised political sway over much of the northern part of British America.

MANUFACTURES

Canada is not an important manufacturing country, though manufacturing industries are being slowly developed. There are two reasons for this; one is that the wages paid in the United States are such as to draw many of the most skillful workmen away from the Dominion; and the other is, that Canada, notwithstanding the tariff, can purchase the same grade of manufactures from the United States cheaper than they can be made at home. Montreal is the leading manufacturing center, and has large sugar refineries, also iron foundries, cotton and shoe factories, and numerous other industries. Toronto also has several important manufactories, and Quebec has large tanneries. Windsor, opposite Detroit, and Hamilton, Ontario, are becoming manufacturing centers of local importance. Most of the manufactured product is for home consumption, though agricultural implements, cheap cotton and woollen goods, cutlery, leather and shoes are exported to a limited extent.

TRANSPORTATION

Quebec and Ontario are well supplied with railroads; the former by the Grand Trunk, the Central Vermont and Boston & Maine Systems; the latter by the Grand Trunk and Canadian Pacific lines. The Intercolonial Railway extends from New Brunswick to Montreal, and the Canadian Pacific from Montreal to British Columbia, having branch connections with Detroit, St. Paul and Minneapolis. This is the longest continuous line in North America. Branch connections of the Northern Pacific and the Great Northern extend to Winnipeg, and a transcontinental line is projected by the Grand Trunk Company to provide an outlet for the great wheat region. In all, the Dominion has about 18,000 miles of railway.

The St. Lawrence and the Great Lakes furnish a waterway of

over 2400 miles inland. This has been greatly improved by canals, as described in Chapter XVII., Part II. The Saskatchewan and McKenzie Rivers afford water routes to the great central interior during the summer.

While the Atlantic ports of Canada are, on account of the form of the earth, nearer Liverpool than those of the United States, yet they have the disadvantage of being closed by ice dur-



VICTORIA BRIDGE, MONTREAL

ing a portion of the year, so that the United States ports have to be used for the eastern outlets of the Dominion during the winter.

Cities Montreal, having a population of 270,000, is the commercial and financial center of the Dominion. It is the principal terminus of the Grand Trunk and the Canadian Pacific Railways, has large manufacturing industries, numerous banks, and during the summer is the terminus for trans-Atlantic lines of steamers. Toronto is the principal city of Ontario and

second in importance in the Dominion. It has important manufacturing industries and is the trading center for a large portion of well developed and wealthy country. It has good steamer connections on Lake Ontario, is an important railway center and carries on considerable trade with the United States. Quebec has a good harbor and some foreign commerce, but it is of more interest historically than commercially. Halifax is the most important



THE HARBOR, QUEBEC

seaport of the maritime provinces and has a good harbor. Winnipeg, with a population of 65,000, is now an important railway and distributing center in Manitoba, and the districts to the west and northwest. It is in the center of the great Canadian wheat region and is destined to become a commercial city of considerable importance. Vancouver and Victoria, in British Columbia, are the important trading centers of these provinces. They have direct lines of steamers plying between them and Asiatic ports, and others connecting them with the Pacific ports of the United States.

Commerce The bulk of foreign trade is with Great Britain and the United States, between which it is about equally divided. England takes most of the surplus raw material and dairy products, while we take lumber, coal, fish and furs. Canada imports most of her manufactures from the United States and they consist of cotton goods, agricultural implements, carriages, machinery, clocks and watches, hardware and boots and shoes. Canada sells to Great Britain more than she buys of her, and buys of us more than she sells us. Her internal commerce is greatly aided by the excellent waterway furnished by the St. Lawrence River and the Great Lakes and their connecting system of canals.

Canada, like the United States, has developed rapidly during the last quarter of a century, in which time her trade has more than doubled. Since the opening of the rich lands to the north and west of Manitoba this region is being peopled by the most desirable class of immigrants, and the development of this vast country will create such a demand for manufactures, that undoubtedly new industries which will be of great benefit to the country will be established.

With abundant resources, an intelligent and progressive population and geographical advantages almost equal to those of the United States, Canada is the most important province of the British Empire.

NEWFOUNDLAND Politically Newfoundland is not a part of the Dominion of Canada, but is governed as a distinct British Colony. Fishing constitutes the principal industry of the island. There are also many good farms, and agriculture is practised to a considerable extent. The fish are exported to the United States, the West Indian Islands and European countries. St. Johns, the capital, has a fine harbor and is wholly engaged in the fishing trade. There are no other towns of importance on the island.

QUESTIONS.

What portions of the United States have a climate similar to that of most of the Canadian provinces?

Why is agriculture the principal industry of Canada? In what products does Canada compete with the United States in the markets of the world?

What portions of Canada are now being rapidly developed? What has led to their development?

What has given Montreal and Toronto their importance as commercial centers?

What are Canada's imports from the United States? What does she export to this country?

CHAPTER II.

MEXICO AND CENTRAL AMERICA.

MEXICO.

Position and Extent The Republic of Mexico extends from the thirty-second to the fifteenth degree of north latitude. In area it is about equal to that part of the United States east of the Mississippi River. It is a long and narrow mountainous plateau, rising abruptly from each coast to a height of from 4000 to 8000 feet, and formed by a continuation of the Rocky Mountains, which are here known as the Cordilleras. Some of the volcanic peaks have an altitude of nearly 20,000 feet.

Climate The location of Mexico would indicate a tropical climate, but this is greatly modified by the altitude. The inhabitants recognize three climatic zones; the hot zone, which they call Tierra Calienta, extending from sea level to an altitude of 3000 feet; the temperate zone, Tierra Templada, extending from 3000 to 5000 feet; and the cold zone, Tierra Fria, having an altitude of from 5000 to 7000 feet and over. There are two seasons, the hot, extending from May to October, and the dry, during the remainder of the year. During the wet season, rain falls daily, but good drainage gives the temperate belt very healthful climate. The interior plateau and the northern portion of the western coast have but little rain.

Resources The agricultural products of the three zones are characteristic of their respective climates. Along the coast and in the lower altitudes coffee, rubber, sugar-cane and tropical fruits are the staple products; in the temperate belt, cereals, especially corn, and fruits of the temperate climates are

cultivated. Corn is the most important crop, and Mexico ranks third among the corn-producing countries of the world, being exceeded by the United States and Austria-Hungary. Cacao is grown, and tobacco is an important crop, because of its excellent quality. Some cotton is raised, but not enough to supply the needs of the local mills. The forest products include cedar, oak, walnut, ebony, rosewood and mahogany. Sisal hemp, or henequin, is grown extensively in Yucatan, and is exported in large quantities. The northern part of the country and the high plateaus are well adapted to grazing, and quite a number of cattle and sheep are raised in these regions.

The mineral resources are of the greatest importance. Mexico is the leading silver-producing country, her output being about one-third the world's supply. Considerable gold, mercury, iron, copper, lead and tin are also obtained. In most places the crudest methods of mining prevail, but capitalists from the United States have become interested in some of the leading mines and introduced modern methods. Building stone of excellent quality is abundant, and the Mexican onyx is highly prized for finishing interiors. Coal, asphalt and petroleum have been found, but have not been worked to any extent.

Inhabitants The inhabitants are Spaniards, Indians and a mixed race, descendants from the intermarriage of the other two. The population numbers about 12,000,000. The Indians and Mexicans are engaged in agriculture and mining. There are but few manufactures, and these are either under the control of the Spaniards or Americans who have recently established them. Spanish is the prevailing language.

Commerce The United States, Germany and Great Britain take most of the foreign trade. Our share is not as large as that of the European countries. We import rubber, coffee, gold and mining products, and export cotton goods, boots

and shoes, machinery, hardware and tools, scientific apparatus, carriages and railway appliances. Our exports amount to about \$149,000,000 a year, and our imports about \$65,000,000. Undoubtedly the difference in language is one of the principal barriers to an increased commerce with the Mexicans, as it is much more convenient for a people to trade with those with whom they can converse freely.

Transportation

All the important cities are connected by railway and telegraph, and two trunk lines connect the country with the United States. The Tehuantepec Railway is the most important trunk line and connects the Atlantic and Pacific Oceans. It is under the management of English capitalists, and until the completion of the Panama Canal will continue to be of great importance in shortening the trade route between the Atlantic and Pacific ports. There is a good coastwise trade on the Gulf. The leading ports are Tampico and Vera Cruz. Mazatlan, Acapulco, San Blas and Manzanillo are the important ports on the Pacific coast. Acapulco has an excellent harbor, but on account of lack of railway connection its trade is quite small. Mexico, the capital, is situated in the interior on a plateau of 7000 feet altitude, and is a modern American city.

CENTRAL AMERICA.

This is a narrow mountainous stretch of country reaching from Mexico to Panama. It comprises five small individual states; Guatemala, San Salvador, Honduras, Nicaragua, Costa Rica and the British Colony of Balize, sometimes called British Honduras. The entire area is about equal to that of the New England and Middle States.

The country is low and unhealthful on the Caribbean Coast, but more elevated along the Pacific Coast. The elevated regions are comparatively healthful, and most of the people live among the

highlands. The climate and products are wholly tropical. The inhabitants are Spaniards, native Indians, negroes and the descendants from these races. Most of the interior is unsettled. The people lack ambition, and industries and commerce languish. Agriculture and lumbering are the only industries practised, and these are carried on in a very primitive manner. The prospect of an Isthmian Canal across Nicaragua for a time gave that state some political prominence, but that, with the canal, has now passed to Panama.

The commerce of these states is limited because they are undeveloped and also on account of the lack of transportation facilities. A railroad extends across Costa Rica, from Port Limon to Puerta Arenas, which has an excellent harbor, but aside from this there are no railways in the states, nor even carriage roads that are passable. Coffee, hides, mahogany and tropical fruits are the only exports of importance. About one-half of the fruit trade is with the United States. We send them cotton goods, tools, hardware, flour and wine. Their entire trade with the United States amounts to about \$16,700,000, of which \$9,500,000 are exports and \$7,700,000 imports.

QUESTIONS.

How do you account for the great variety of products that can be produced in Mexico?

Why are the industries and resources of the country so poorly developed?

What railway connection does Mexico have with the United States?

With what countries does Mexico carry on most of her foreign commerce?

Why is the commerce of the Central American States so insignificant?

CHAPTER III.

SOUTH AMERICA.

Position and Surface

With the exception of a few extreme points South America extends from the tenth parallel of north latitude to the fiftieth parallel of south latitude. Nearly all of the continent is in the Torrid or South Temperate Zones and its latitude would give it a tropical or a semi-tropical climate, but in the western part this is greatly modified by the mountains.

In its general plan the surface of South America resembles that of North America, the great Andean Mountain system extending the entire length of the continent on the western side. The average height of these mountains is greater than that of the Rocky Mountains, the ranges are nearer together, and the intervening plateaus are narrow. The Andes are nearer to the coast than even the Coast Ranges in North America, and their western descent is very steep, consequently the rivers flowing into the Pacific are few, small and rapid, and are of little or no aid to commerce. The eastern slope is long and more gradual, merging into the great plains that extend to the Atlantic Coast.

The eastern highlands are divided into two groups, the Guiana Highlands between the Amazon and the Orinoco, and the Brazilian Highlands south of the Amazon. Both groups consist of old mountains that have been worn down, so that their rounded summits resemble those of the Appalachians.

The Guiana Highland is loftiest in the west, where the highest summits have an altitude of 8000 feet or more. These descend by terraced slopes, forming on the north one side of the Orinoco

basin, while the other side is formed by the southern and eastern slope of the Andes.

The Brazilian Highland reaches its greatest altitude near the tropic, where it is 8500 feet, with an average of from 4000 to 5000 feet. The region is characterized by a large number of ranges of high hills and low mountains that have been worn down, the material thus removed forming the plateau at their base.

The great Basin of the Amazon lies between the Guiana Highland on the north and the Brazilian Highland on the south, and extends westward to the base of the Andes. The southern boundary is formed by a low, irregular divide which separates the tributaries flowing into the Parana and the Plate. The tributaries of the Amazon from the south are all large, and nearly all have falls at about the middle of their course, which obstruct navigation.

The basin of the Plate is long and narrow, and consists of the lowlands formed by the flood plains about the mouth of the river, and the highlands surrounding this region of lowland and extending westward to the Andes. The Amazon and Plate with their tributaries form an extensive system of waterways that are of the greatest value to the region through which they flow.

Climate Most of South America has a tropical climate, with two seasons, the rainy and the dry. The great altitude gives those portions of the plateau between their northern extremity and the vicinity of the Tropic of Capricorn, a temperate climate; while some of the highest peaks are capped with snow. Most of this portion of the plateau is also arid.

The Guiana Highland and the Orinoco basin have a warm temperate climate, and the highest temperature is reached during the northern summer, when the heat is so intense that the people forsake the lowlands for the mountains. An abundance of rain falls during the rainy season.

The basin of the Amazon is characterized by intense heat and

heavy rainfall. These conditions account for the dense forests of the Amazon valley and other luxuriant vegetation of the region.

The basin of the Plate has a tropical and sub-tropical climate, with plenty of rain until the extreme southern portion is reached. Here arid conditions are found, but there is sufficient moisture to afford excellent grazing regions. The southern portion of the continent has a temperate climate.

The People Brazil was settled by the Portuguese, but all of the other South American States are of Spanish origin. Portuguese is the language of Brazil, and Spanish that of the other countries. Aside from these two nationalities there are but few white people on the continent. These are mostly Germans and Englishmen. Indians make up a large part of the population. There is also a third class which comprises the descendants of the native races mixed with the Spaniards. In the tropical regions the people lack ambition and enterprise, but the inhabitants of Chile and Argentina are energetic and progressive.

Government With the exception of the Guianas, which are, respectively, British, French and Dutch colonies, all of the South American States have a republican form of government, patterned quite closely after that of the United States. Ever since these countries became independent they have been disturbed by political strife and frequent revolutions, and these conditions have prevented the development of their resources or the establishment of any important industries. The eastern countries occupying the lowlands are much more important commercially and industrially than the others. Most of the foreign trade is carried on with Great Britain, France, Germany and the United States, the countries ranking in importance in the order named. From an industrial point of view these countries can best be divided into two groups: the Andean countries and the countries of the lowlands.

THE ANDEAN COUNTRIES.

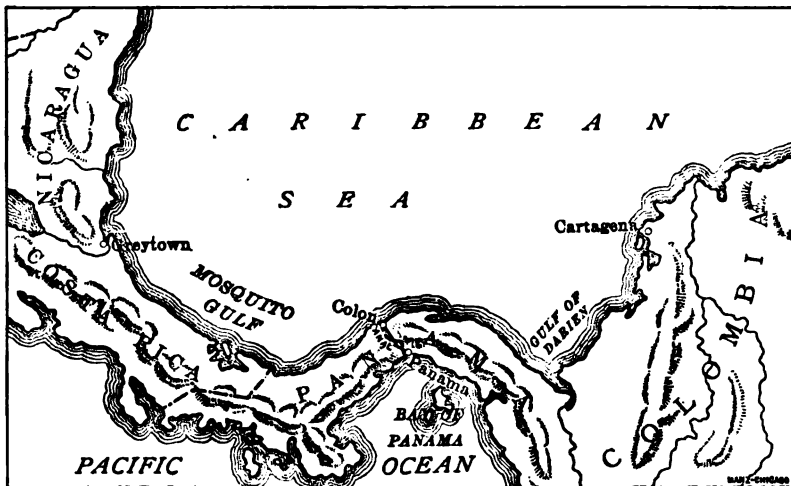
PANAMA Panama is the most northerly country of South America, and the most recently formed republic of the world. It is a long, narrow strip of land, co-extensive with the Isthmus of Panama. Its length is about 460 miles, and its width varies from thirty-one to seventy miles. In area it is about equal



THE HARBOR, PANAMA

to the State of Indiana. The surface is high and rocky on the Pacific coast, and low and marshy on the Caribbean coast. The climate is tropical, damp and unhealthful to all save the native people. The population is composed chiefly of mixed races which have descended from Spanish, Indian and negro origin, and there are but few white people in the country. There are no manufactures, and the commerce, as far as the country itself is concerned,

is of no importance. Panama, the capital, is the Pacific terminus of the Panama Railway, and has a population of about 25,000. It is the financial and commercial center of the country. The only other town worthy of mention is Colon at the Caribbean terminus of the railway. This has a population of about 3000, and at present is of considerable importance on account of its relation to the Panama Canal.



PANAMA AND THE PANAMA CANAL

Panama was originally a state of Colombia, and revolted and declared its independence in 1903, because the Colombian government refused to ratify the treaty with the United States providing for the construction of the Panama Canal. The revolution was entirely peaceable, and the new government received the official recognition and the moral support of the United States, and the leading countries of Europe soon followed our example. The desired treaty, which the Colombian government rejected, was ratified between Panama and the United States, and the canal, which

has already been described (see page 30), is now in the process of construction. The completion of this canal will give this small republic one of the most important waterways of the world.

COLOMBIA The United States of Colombia occupies the extreme northwestern portion of the continent. It has an area of a little over 519,000 square miles, and the population is about three and one-third millions. On account of the various altitudes, a country like Colombia has three climatic zones: the tropical region of the lower altitudes, the temperate of the medium and the cool of the high altitudes. The east coast is low and unhealthy. It is valuable for grazing purposes, and large numbers of cattle and sheep are raised. The plains and the mountains produce wheat, domestic animals and some other agricultural products common to temperate regions. The tropical products are coffee, cacao, tobacco, vegetable ivory, copaiba, tolu and rubber, all of which are gathered by the Indians. The mountains contain large deposits of gold and silver, and valuable salt mines are worked near Bogota. These are a government monopoly, and considerable revenue is derived from them.

Transportation facilities are very poor. There are a few short lines of railway extending from the coast towns inland, but the interior is entirely lacking in carriage roads, and goods are transported by pack trains. The Magdalena and its tributaries are navigable for 600 miles to La Dorado, and steamers can ascend the Orinoco as far as Cabugaro, which is within about 200 miles of Bogota. Bogota, the capital, and Medellin are the only two cities of any importance, and they are so situated that commercial relations between them are practically impossible. Barrinquilla and Sabanilla, at the mouth of the Magdalena, are the ports through which most of the foreign trade is carried on. This is of but little importance. The country exports hides, tallow, tobacco, and copaiba and tolu to the United States; and gold and silver ore to

Great Britain. The imports consist of textiles and other manufactures, most of which are obtained from Great Britain, while from the United States the country receives its supply of oils and petroleum.

ECUADOR Ecuador is a little larger than New Mexico and has a population of about 2,500,000, most of which are Indians. The exports are cacao, coffee, sugar, Peruvian bark, ivory, nuts and rubber. Cacao constitutes about three-fourths of the exports. The land is held in large estates and the laboring people are in a condition bordering on slavery. The most important article of manufacture is Panama hats. These are made from torquilla straw, which is the midrib of the leaf of the screw pine. The work is done almost wholly by Indians, and because dampness is essential to success most of the hats are made at night.

The imports are food stuffs and manufactured textiles. The country has extensive mineral deposits, which, undoubtedly, are rich, but they have not yet been developed. The copper, gold and silver mines are worked to a limited extent. Transportation is exceedingly poor. Most of the goods are carried on pack animals. A carriage road extends from Quito, the capital, to Guayaquil, the leading seaport, a distance of 115 miles. Most of the foreign trade is with France and Great Britain. That with the United States amounts to about \$1,000,000 a year.

PERU Peru is situated south of Ecuador, and lies almost wholly among the mountains, with a long desert sea coast on the Pacific. In area Peru is about equal to Washington, Ohio and California, and has a population of about 14,610,000, more than one-half of whom are native Indians. Most of the country has a high altitude and a cool temperate climate. In the northern part, the eastern slope of the mountains is heavily timbered. As a whole, the country has but little rainfall. The leading agricultural products are cotton, sugar, coffee, cacao and tobacco. The other

products are cinchona, from which quinine is made; cacao and other medicinal plants, dye stuffs and rubber. The country has considerable good grazing land and many sheep. Llamas and cattle are raised; from these wool, alpaca and hides are exported.

Peru is rich in minerals, and mining is the leading industry. Gold, silver, copper, lead, zinc and mercury compose the metals, and coal, salt, borax, sulphur and petroleum the non-metals which are exported. The manufactures are straw hats, woollen fabrics, sugar, candles, soap, shoes and a few other small articles. All manufacturing is on a small scale and in a crude state. Its purpose is to supply the local demand only. The country lacks capital, and means of transportation are still poor. There are about 1000 miles of railway in operation. The Amazon and its tributaries afford good water routes for the eastern portion of the country, and this is of great advantage, as most of the trade is on the eastern side of the mountains. Lima, the capital, and Callao, the principal seaport, are connected by railway. Most of the foreign trade is with Great Britain and France, the United States having only a small portion. The country also has considerable trade with the surrounding South American States.

BOLIVIA Bolivia, an inland country, has an area of some over half a million square miles, being equal to California, Colorado, Arizona and New Mexico. The population is only two and a half million. Bolivia is wholly an inland country, and its only outlet to the sea is through one of the surrounding states. The country is rich in resources, but in a very backward condition. Agriculture is the most important industry, and the chief crops are coffee, rubber and sugar. Cereals and vegetables are grown on the tablelands, and cattle, sheep and llamas are raised in large numbers. The lowlands and plains are fertile, and many of them contain dense forests, from which cinchona bark and other valuable medicinal products and dye stuffs are obtained.

Transportation is exceedingly poor. The plains afford good location for highways leading down the eastern slope. A railway has recently been completed which connects the country with the railway in Argentina, and Lopaz, the chief city, is also connected with the seaport of Antofagasta in Chile. Sucre is the capital and city next in importance. Most of the trade is with the surrounding states. The exports are coffee, rubber, cacao, copper, silver and tin, and the imports are manufactured clothing, textiles, food stuffs, hardware and spirituous liquors.

CHILE Chile is the most important of the Mountain States. It is a long, narrow country, having an area about equal to that of the Pacific States, and extends from the Tropic of Cancer southward for a distance of nearly three thousand miles. Though having but a small proportion of fertile land this is so well cultivated that the country produces abundant crops of wheat, barley, and various other food stuffs of the temperate regions, and fruits are grown in sufficient quantities to supply the home market and also to furnish exports for the neighboring states of Bolivia, Peru and Ecuador. A great deal of the cultivated land is under irrigation. The uplands furnish excellent grazing and large numbers of sheep and cattle are raised. These furnish merino wool and hides and leather for export.

The mineral resources are by far the most important, although the northern part of the country is a desert. It contains extensive deposits of nitrate, or Chile saltpetre, which occurs in the form of a soft crystalline rock that is mined and exported to Europe and the United States, where it is ground and used as a fertilizer, and in the manufacture of certain chemical products. The next most valuable mineral product is copper, nearly all of which is exported to Great Britain. Coal is mined in the southern part of the country, but since it is not of suitable quality for smelting purposes considerable is imported from Australia.

The country is well supplied with railways, most of which are built and operated by the government. Santiago is the capital and Valparaíso is the chief seaport, and also the business and financial center of the Pacific coast of South America. Most of the forwarding trade at this point is carried on by German and British merchants. A railway has recently been completed, extending from this port to Buenos Ayres. This is destined to become a very important trans-continental line, since it saves transporting goods around Cape Horn. The other important towns are Concepcion, Talca, Chillan, Iquique and Copiapo. The foreign trade is controlled by Great Britain, which has about two-thirds of it; Germany and France have most of the remainder. The United States supplies the country with a portion of its textiles, and also with lumber from Oregon and Washington, and with petroleum. Our imports are principally nitrate.

THE LOWLAND COUNTRIES.

VENEZUELA Venezuela is the most northerly country bordering on the Atlantic. In area it is about equal to Texas, New Mexico, Arizona, Oklahoma and the Indian Territory. The population is about two and one-half million, about one-seventh of which are Indians. The country has a tropical climate, and is unhealthful except in the mountainous regions. The lowlands have a tropical vegetation, but the higher altitudes produce the plants of the temperate zone. The leading industries are agriculture, grazing and the gathering of forest products. Coffee is the most important crop, and about 200,000 acres are devoted to its cultivation. Cacao and sugar are grown in the lowlands, and cereals in the mountainous districts. The llanos are great plains covered with grass, which furnish pasturage for herds of cattle, sheep, horses, goats and swine. The mineral resources are important, and consist of gold, silver, copper, iron, sulphur,

petroleum, asphalt, coal, salt and kaolin, from which porcelain is made.

Asphalt is a mineral pitch, or solid form of bitumen, and is derived from sources similar to those from which coal and petroleum have been formed. The lake on Trinidad is from eighteen to seventy-eight feet in depth, and is estimated to contain 6,000,000 tons.

A large lake of asphalt on the Island of Trinidad is under the management of American companies. Numerous large pools of this mineral are also found along the neighboring coast. It is extensively exported, and used in asphalt pavements.

The country is poorly equipped with roads, and there are only 500 miles of railway consisting of certain short lines that extend from the agricultural districts to ports on the Caribbean. Nearly all goods are transported by pack animals, except in the region of the Orinoco, which furnishes a good waterway for that portion of the interior through which it flows. Caracas, the capital, and Valentia on the Caribbean, are the most important cities and are situated in the midst of a fertile and productive agricultural district. Maracaibo, Puerto and Cabello are the principal seaports. The country lacks capital, and frequent uprisings and revolutions have nearly ruined its industries.

The foreign trade is with the United States, Great Britain, France, Germany and Spain. We furnish the Venezuelans with one-fourth of their imports, consisting of cotton fabrics, ironware, flour and canned goods; and receive from them coffee, hides, rubber and asphalt.

GUIANA Guiana is divided into three colonies known respectively as British, French and Dutch Guiana; these constitute the only colonial possessions in South America. In area the country is about equal to California and New York. Fully one-half of the territory belongs to Great Britain, and the re-

mainder is about equally divided between France and Holland. The climate is tropical, and unhealthful along the coast. Only small tracts of land are under cultivation, and these consist of narrow strips along the coast region which are protected by dykes. Sugar-cane is the chief agricultural product but the manufacture of beet sugar in the northern countries has greatly crippled the sugar industry in this part of the world. The country is rich in gold and diamonds, but the mines have not been extensively worked. Georgetown in British Guiana, Cayenne in French Guiana, and Parimaribo in Dutch Guiana, are the capitals of the colonies and the principal towns. The leading exports are sugar, cacao, coffee, molasses and rum; and the imports are manufactured articles and food products. The principal trade is that with the mother countries, the United States having a small portion of it. Compared with the commerce of other countries that of Guiana is unimportant.

BRAZIL The Republic of Brazil is nearly as large as the United States including Alaska, and occupies about one-half of the continent. It extends from the fifth parallel of north latitude to the thirty-third parallel of south latitude. The Equator crosses the northern part and with the exception of the extreme southern portion, which is in the temperate zone, the country has a tropical climate. The population is variously estimated from fifteen to eighteen millions. It consists of Portuguese, negroes, native Indians and mixed races that have descended from these, together with a few Europeans and Americans. The country is naturally divided into three productive districts; the Amazon Basin, the Middle Coast Region and the Southern Coast Region. Most of the interior is still a vast wilderness.

The Amazon Basin includes more than half the country, and supports the most dense and extensive tropical forests in the world. At present the great product of the forest is rubber, of which it supplies nearly one-half of the world's crop. This is

gathered by the Indians, who live in a half civilized state, and whose crude methods have greatly damaged many of the rubber trees. The Amazon crop also includes much of that gathered from the neighboring states. Most of it is shipped from Para, which is the greatest rubber port in the world. These forests also contain an inexhaustible supply of hard and soft woods suitable for all



VIEW ON A COFFEE PLANTATION

sorts of cabinet and building purposes, but the time for developing the lumbering industry is not yet ripe.

The leading products of the middle coast region are cotton and sugar-cane, and of the southern coast region and interior, coffee. Rice, black beans and manioc are the most important food products; yams, sweet potatoes, tropical fruits and maize are also grown. Brazil nuts grow wild, and are exported in large



BRANCH OF A COFFEE TREE, SHOWING FLOWERS AND FRUIT

quantities. These nuts grow in large spherical pods, containing 24 each. The pods are broken open and the nuts separated before placing them on the market.

Coffee is the most important agricultural product, and Brazil produces more than one-half of the world's supply. It is the seed of an evergreen shrub, which, when growing freely, reaches a height of from 10 to 20 feet. Under cultivation, the tree is kept cut down to 7 or 8 feet, and the branches bend down nearly to the



DRYING COFFEE

ground. The leaves are about 5 inches long, slender, and have a bright green, glossy surface. The flowers appear in the axils of the leaves, and are small and pure white. The fruit is a two-celled berry, of about the size and appearance of a cherry; when ripe, it is of a dark red color. Each cell contains a seed which forms the coffee nib or bean. The orchards are kept well tilled and free from weeds. When the fruit is ripe, cloths are spread under the trees and they are shaken, which causes the

berries to fall. The berries are dried on mats in the open air, then crushed between rollers to free the seeds from the husk. After a second drying in the sun, the seeds are winnowed, then packed in sacks ready for shipping. The average yield is about a pound to a tree, but the best trees often yield three or four pounds.

The great mineral region extends along the Bolivian border to Matto Grosso, and eastward to the Rio Grande du Sul. Gold, silver, diamonds, and other precious stones, are found in this region. Before the discovery of the diamond mines in South Africa, those of Brazil were the richest in the world. Iron, copper and coal are also found in paying quantities, but they have not been worked.

Manufactures are still in a primitive state, but foreign capital, principally from Germany, is invading the country and establishing new industries. The resources of Brazil are more extensive than those of any other South American country, and these establishments will, undoubtedly, continue to increase in size and number.

The Amazon and Parana, with their tributaries, furnish a series of waterways leading to all ports of the interior. These rivers are of the greatest commercial importance, since without them it would be impossible to transport the rubber and other forest products to the coast. The roads are generally poor, but there are about 15,000 miles of railway in operation, consisting principally of short lines extending from the plateau to the nearest seaport. Most of the railways are owned by the government, and leased to private corporations. Rio Janeiro is the largest railway center.

The transportation facilities are still entirely inadequate to the demands made upon them, and with the extension of railway lines and the construction of good roads, the interior of the country could be profitably developed, and this would lead to great increase in production. Rio Janeiro is the capital and commercial center.

It is the largest coffee market in the world, and is the second largest city of the continent, having a population of about 750,000. It has an excellent harbor and steamer connections with the leading ports of the United States and Europe. Para, at the mouth of the Amazon, has an extensive trade in rubber. Pernambuco is an important sugar, coffee and cotton market. Porte Alegre is the seaport for the German colonists, and Bahia has a large trade in cotton, sugar and tobacco.

The annual foreign commerce amounts to about \$300,000,000, and it is divided between Great Britain, Germany, France, the United States and a few other countries. The leading export is coffee, which is by far the most important product of the country, and the one from which the greatest amount of revenue is derived. The annual export is about 600,000,000 pounds and nearly the entire crop is taken by the United States. Rubber is second in importance, and in the production of this, Brazil also leads the world. Other exports are hides, tallow, cotton and Brazil nuts. The trade with the United States is increasing from year to year. We import from Brazil about \$80,000,000 worth of coffee and rubber, and export to that country about \$11,000,000 worth of flour, cotton goods, machinery, hardware, iron and steel goods and petroleum. There are regular lines of steamers plying between the United States and the most important Brazilian ports.

ARGENTINA Argentina, or the Argentine Republic, occupies the southern half of the eastern part of South America. It is about one-half the size of the United States, and has a population of about 4,000,000. A small section in the northern part has a tropical climate, but with this exception the entire country lies within the south temperate zone. The plains in the north have a tropical climate and vegetation; those of the central portions have a warm and temperate climate, while the plains of the south have a colder climate. The mountainous

region, which extends along the entire western part of the country, is cooler than other portions in the same latitude. The climate varies here with the altitude and the season of the year. Argentina is almost entirely one vast fertile plain, and is especially adapted to stock raising and growing cereals. It has become one of the largest wool producing countries of the world, and is now competing in the markets of Europe, with Russia and the United States, in the sale of wheat and dressed meat. The annual yield of wheat is now about 100,000,000 bushels, and over two-thirds of it is exported. Flax, corn and sugar-cane are also successfully grown, as are various kinds of fruits suitable to the temperate and semi-tropical latitudes. Grape culture and the manufacture of wine are also becoming important industries.

The country is well supplied with minerals. Gold, silver and copper ores are abundant in the mountain districts and gold is also found along the coast as far south as Tierra del Fuego. Coal, principally lignite, petroleum, sulphur, borax, nitrates, salt and iron are found in sufficient quantities to be profitably mined. The foot hills and lower portions of the mountains are covered with extensive forests that yield timber and other valuable products.

Manufacturing is not extensive. What there is consists of the manufacture of flour and wine and in distilling and brewing. Nearly all of the manufactured products are imported. Argentina is better supplied with railways than the other South American countries, and the system is being continually extended. The recent completion of the transcontinental railway, from Buenos Ayres to Valparaiso in Chile, is one of the most important commercial enterprises of the entire continent, and is destined to be of great value to the Republic. Buenos Ayres, on the right bank of the Plate, is the capital, and financial and commercial center. It is the largest and most important city of South America. In its buildings, its streets and its public utilities it is a thoroughly modern city, and far in advance

of any other city of the continent. It has a large trade with European countries, and the United States. Other important cities are Rosario, Santa Fe, Parana and Cordova, each of which has a good market for the surrounding farming regions.

The country has a growing and valuable foreign trade. The most important exports are: wool, hides, skins, corn, preserved meats, domestic animals, flax, tallow and fat and wheat. Mutton is frozen and exported to Europe in refrigerator ships, while beef is jerked, or dried, and exported in this form. The imports are agricultural implements, textiles, boots and shoes and clothing. The trade is carried on with Great Britain, France, Germany, Belgium, United States and Italy. The exports to this country are confined almost entirely to cattle products and wool, while we send to them agricultural implements, iron and steel goods, oils, cotton goods and wood and its manufactures. Our exports amount to a little over \$8,000,000 per year. The rivalry of the European countries for this trade is detrimental to the commercial interests of the United States and Argentina.

Argentina is the most progressive of the South American countries. It has ample resources, a fertile soil and a temperate climate. Its inhabitants are energetic and progressive, and the government is stable and well disposed towards all lines of industry. During the last few years a large number of immigrants from Southern Europe have entered the country. With the addition of necessary capital to develop its resources, this Republic is in a fair way to become a strong rival of the United States in the markets of Europe, since it will be able to export large quantities of wheat and other food products.

URUGUAY Uruguay is a small country situated on the opposite side of the Plate from Argentina. It has a large foreign population, and is in excellent financial condition. The principal industry is stock raising, and much attention has been

given to improved breeding, by the introduction of European stock. The scientific methods pursued have made this little state one of the foremost cattle and sheep countries of the world. The value of the animal products exported is about \$40,000,000 a year. The soil is fertile; wheat and other cereals are raised, and some wheat is exported. Montevideo is the capital and most important city. The exports go to France and Argentina, and most of the imports are textiles and machinery, which are supplied by Great Britain and the United States.

PARAGUAY Paraguay is a small interior state to the north of Argentina. Most of its surface is covered with dense forests. The soil is fertile, and the climate is suitable for the growth of wheat and other cereals, but owing to the lack of transportation facilities, scarcely any of the resources have been developed. Sugar and mate, or Paraguay tea, are the only crops exported and these are of but little value. Asuncion is the capital and chief city.

QUESTIONS.

What effect do the Andes have upon the products and industries of South America?

What interests do the United States hold in Panama? What is the present condition of the Panama Canal?

Why do the Andean countries have so little commerce?

What conditions have made Chile the most prominent of these countries?

Which of the South American countries the most closely resembles the United States in climate and products? In what does this country compete with the United States in the markets of the world?

With what South American country do we have the largest trade? Why? Why do European countries have a larger trade than the United States with South America?

What has caused the United States to take so much interest in Venezuelan affairs?

How do you account for the lack of manufactures in South America?

CHAPTER IV.

THE WEST INDIES.

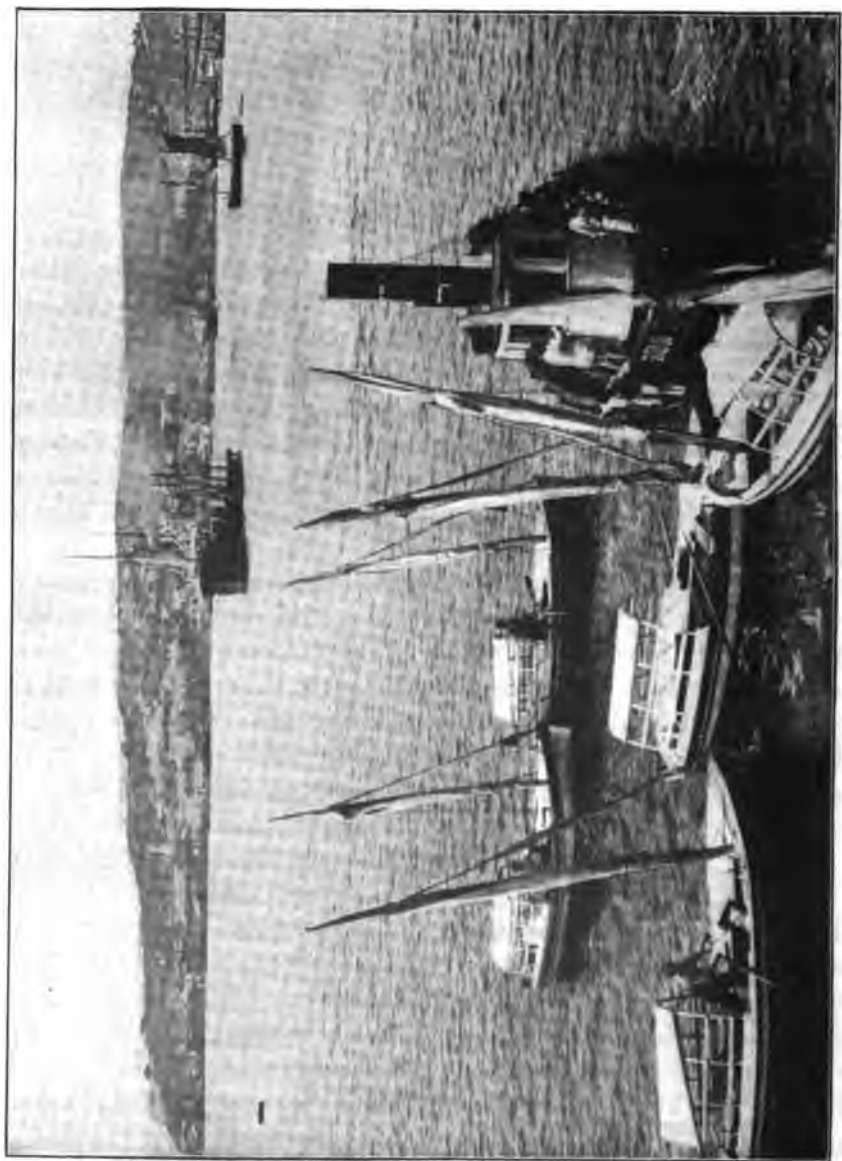
Cuba and Hayti have independent governments, the latter being divided into the states of Hayti and San Domingo, but all the other islands are colonies of Europe.

CUBA Cuba, the largest of the West Indies, has a length of 760 miles, and a breadth ranging from 25 to 130 miles. In area it is about equal to Missouri, and has a population of about one and a half millions, nearly equally divided between whites and negroes. Most of the whites are Spaniards, and Spanish is the language of the island.

The surface is divided into three distinct areas ; the mountainous region occupying the eastern part, a central plain with scattered hills, and the mountainous region in the western part, which has a mountain axis whose slopes descend to the valleys. The coast is irregular and furnishes numerous good harbors. There are a number of rivers on the island, but they are short and of but little commercial value. The soil is fertile, and rainfall is abundant.

Agriculture Agriculture is the leading industry, and sugar constitutes the principal crop, Cuba leading the world in the out-put of cane-sugar. The next crop in importance is tobacco, which is grown with a greater margin of profit than sugar, and is exported in large quantities. Cuban tobacco is of the best quality, and commands the highest prices in all markets. For this reason tobacco from other countries is frequently shipped to the island and reshipped as the Cuban product.

Other Resources The forests contain a large quantity of valuable timber, and iron ore, copper, manga-



THE HARBOR, HAVANA

nese, asphalt and salt are found in sufficient quantities to admit of profitable working. Considerable iron ore is now mined and shipped to the United States since it is especially valuable in the manufacture of steel.

Manufactures Manufactures are limited almost entirely to cigars and other products of tobacco.

The oppressive Spanish rule and the war for independence destroyed most of the plantations and ruined all the industries, but with the aid of this country a new beginning has been made, and the young Republic is now on the road to permanent prosperity. An independent government, republican in form, was organized in 1902, with Tomas Estrada Palma as president. The foreign relations of the Republic are subject to the control of the United States. Provisions for paying up the national debt have been made, a good system of schools, established while under the control of the United States, is maintained, and railways and highways are being extended.

Cities Havana, the capital and chief city, is situated on the north coast, and is a convenient port of call for vessels crossing the Atlantic. It is the commercial and financial center of the West Indies, the largest sugar market in the world, and the third city in the Western Hemisphere in foreign commerce. Its population is 235,000. The other important cities are Cardenas and Matanzas on the northern coast, and Santiago de Cuba and Cinfuegos on the southern coast. All these are connected with Havana by railway and telegraph and Havana has cable connection with the United States.

Commerce Nearly all the foreign trade is with the United States. Sugar and tobacco constitute the principal exports, but others of some importance are iron ore, honey, wax, hides and rum. The trade with the United States amounts to about \$84,000,000 a year, of which \$61,000,000 is exports,

and the balance imports, consisting of agricultural implements, cotton goods, boots and shoes, hardware, machinery and vehicles.

SAN DOMINGO This island is divided between the negro republics of Hayti and San Domingo. The former has been fairly prosperous, but rebellions and revolutions in the latter have completely destroyed all industries and hindered civilization.

OTHER ISLANDS The most valuable of the other islands are Jamaica and the Bahamas, both belonging to Great Britain. To the eastward of these lie the small group of the Danish West Indies and the Virginian group; the Leeward Islands, the French Islands of Gaudeloupe and Martinique; the Windward Islands, including St. Lucia, St. Vincent and Grenada; and the Barbadoes. All raise pineapples and other tropical fruits, and have more or less trade with the United States, but the larger part of the trade is with the respective home countries. The Danish Islands occupy a strong strategic point and for several years the United States has been negotiating for their purchase. Kingston on Jamaica is, next to Havana, the most important city of the West Indies.

QUESTIONS.

What commercial advantages does Cuba have over the other West Indies?

What are the most important products of Jamaica?

Why have Hayti and San Domingo such a limited trade?

How has annexation to the United States helped Porto Rico?

CHAPTER V.

THE UNITED KINGDOM.

The United Kingdom embraces England, Scotland, Ireland and Wales, and is included within the British Isles. The British Empire includes the United Kingdom and all of her colonies. The area of the United Kingdom is about 121,000 square miles, or a little more than three times that of the state of Ohio. Its population is 41,000,000, or about half that of the United States. The area of the British Empire extends over 11,500,000 square miles, and includes one-seventh of the land area and nearly one-fourth of the population of the globe.

The important political divisions of the United Kingdom are : England, which is a little larger than New York ; Wales, about the size of New Jersey ; Scotland, about the size of South Carolina ; and Ireland, which is but little smaller than Maine. England is the largest and most important political division and contains three-fourths of the population of the Isles.

The location of the British Isles is extremely favorable for agriculture, manufactures and commerce. They are adapted to agriculture, because, being in the path of the warm currents and warm winds of the North Atlantic, they have a temperate climate, with an abundance of rainfall, while their high latitude gives them long days during the summer season, and the large bodies of water surrounding them prevent sudden changes of temperature. All these conditions are favorable to the growing of crops. In the lowlands the soil is exceedingly fertile and it is remarkably well tilled. Hay, wheat and vegetables are the leading crops. The yield per acre in each is about double that secured in the United

States. Much of the land is held in large estates, which are divided into small farms that are kept in a high state of cultivation by the method of intensive farming, similar to that used by the truck gardeners near large cities in the United States, and almost universally practised. On the highlands and among the mountains, cattle and sheep are raised in large numbers, sheep being of special importance in Scotland.

Through years of careful breeding, the English farmers have attained the distinction of raising the finest cattle and sheep in the world. The cattle in the North are raised especially for beef, while those in the South are adapted to dairy purposes. Many of these breeds, such as Durhams or Short Horn, the Angus, the Ayrshires, Jerseys and Alderneys, have been imported to the United States, where they have supplanted nearly all of the older and less valuable breeds. The sheep produce the best quality of coarse and medium wool. Some portions of the islands, especially Ireland, are devoted to the growing of flax.

All lines of agriculture are conducted on a scientific basis and the best possible results are obtained, but the agricultural products of the Kingdom fall far short of supplying the needs of the population and large quantities of food stuffs and raw material have to be imported.

Fisheries The fisheries are of considerable importance and occupy a good proportion of the inhabitants living along the coast in the northern part of the islands. Large quantities of herring are salted and exported, and fish of every variety supply the home markets.

Mineral Resources The abundance of iron and coal in England adapts that country to the manufacture of iron and steel products. Coal is found all the way from Southern Scotland to the Bristol Channel near the southern coast. Extensive deposits of iron are also found in the old worn-down

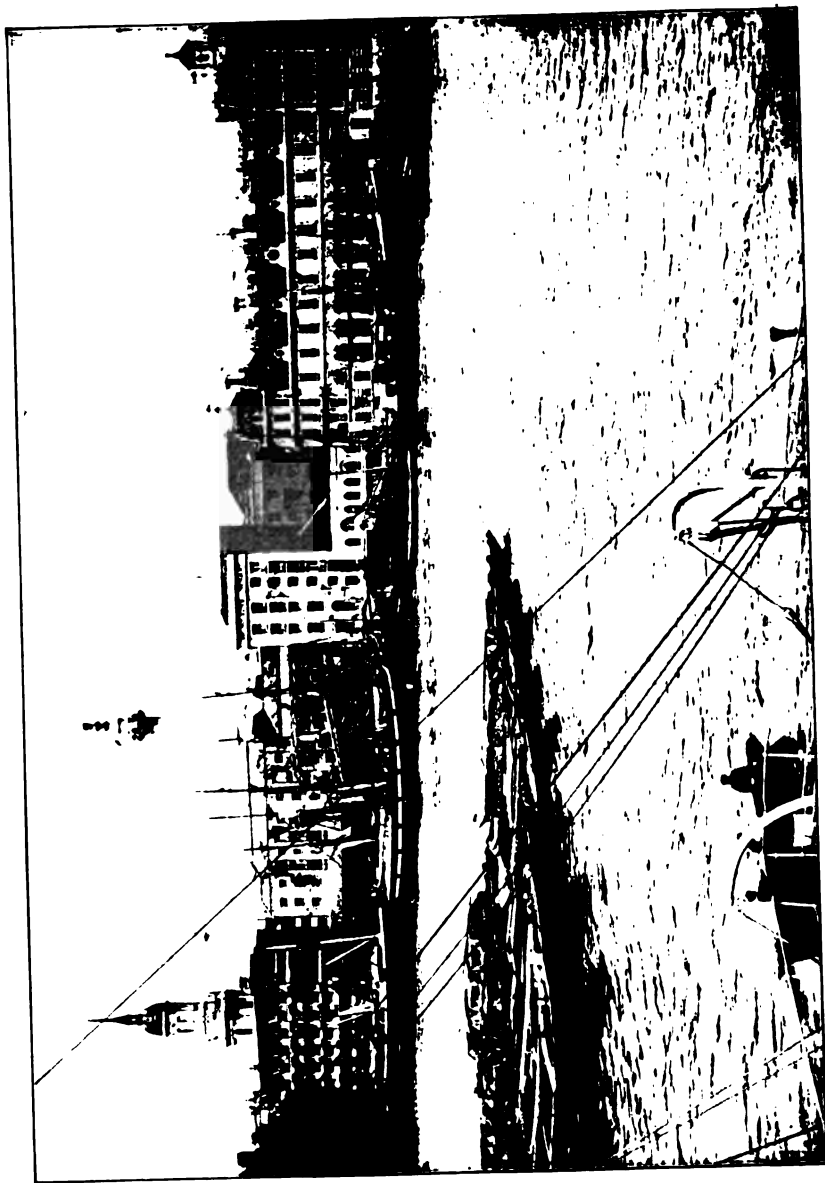
mountains adjacent to the coal fields. Tin and copper occur in considerable quantities, but the manufacturing industries require more of these metals than can be supplied from the home mines, and large quantities of each are imported. The coal supply, however, exceeds the home demand, and some coal is exported to the other countries of Europe.

Manufactures The peculiar advantages afforded for the manufacture of iron and steel and all articles made from them, have, until within a few years, enabled England to lead the world in the manufacture of iron and steel goods. The damp climate is especially adapted to the manufacture of textiles, because most fibers are more successfully worked in a hurried atmosphere. These conditions, combined with the intelligence and genius of the English people, have for many years made England one of the leading manufacturing countries of the world.

Four inventions which have revolutionized the leading industries of the world are due to the ingenuity of Englishmen. These are the power-loom by Edward Cartwright, the steam engine by James Watt, the locomotive by Stephenson and the Bessemer process of the making of steel by Sir Henry Bessemer. Stephenson was not the original inventor of the locomotive, but he was the first to construct a practical road machine of this sort, and for this reason he is considered as the father of the steam railway.

The great manufacturing region is in the northern and western part of England. In the northwestern section of this district, the great cotton and woolen factories are found. Manchester leads the world in the manufacture of cotton goods and Leeds is the most important center in the woolen industry. England manufactures more textiles than any other country; her combined textile industries give employment to more than 5,000,000 people, and the products of her mills are found in all countries of the world.

The metal industries are next in importance to the manufacture



HILLINGSGATE MARKET, ON THE THAMES, LONDON

of textiles. In these iron and steel lead. Birmingham is the center of the iron industry and Sheffield is noted for its cutlery and tools. The abundance of iron and coal has also made ship-building an important occupation and some of the largest ship-yards in the world are found at Glasgow, where the majority of steamships sailing under all flags except the American, are constructed. These are the great manufacturing industries, but nearly all others, to a greater or less extent, are represented in the English workshops, there being scarcely an article in use among civilized people that is not made in the country. For many years England was the leading manufacturing country of the world, but she is now surpassed by the United States.

Cities Except in the northern part of Scotland, and some portions of Ireland, the country is densely populated. In England alone there are thirteen cities each having a population of more than 200,000. To this number must be added Glasgow and Edinburgh in Scotland, and Dublin and Belfast in Ireland. Most of the cities of the kingdom own their public utilities, such as lights, water-works and street railways, and have attained a wide reputation for the excellent management and sound financial condition of these enterprises.

London, the capital, is the financial and commercial center of the Empire and of the world. It covers an area of 623 square miles, about three-fourths as large as the state of Rhode Island, and has a population exceeding four and a half million, and, including the metropolitan and police districts, a population exceeding six and a half million, or, nearly equal to that of the entire state of New York. The city has grown at almost the head of tide-water of the Thames, whose broad estuary opens towards the rich lands of the continent. This location gives London great advantage as a "half way" station for the exchange of the products of the nations, and for centuries it has been the leading market of the world.



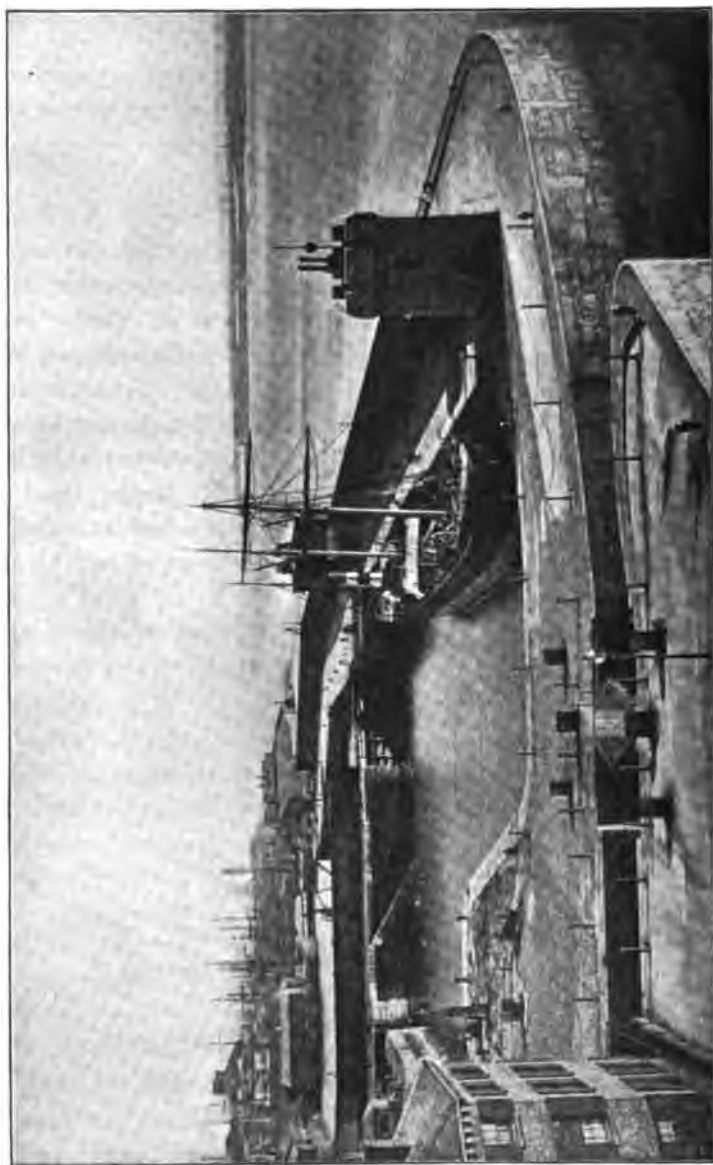
CHEAPSIDE, LONDON

London is the center of the railway systems of the kingdom, as well as the focal point of many ocean routes, but the largest ocean liners anchor about twenty miles down the river on account of shallow water.

Liverpool is one of the most important seaports of Europe. It is the port through which passes nearly all the trade between the United Kingdom and the United States, Canada and other American countries. It has an extensive system of docks and is connected with Manchester by ship canal. The Cunard and White Star Steamship lines have their terminus here. Southampton is also an important port for American trade. Manchester has been made a seaport by the construction of its magnificent ship canal, which admits the largest vessels, and has its banks lined with wharves. Glasgow is noted for its great ship-building and iron and steel industries, and Queenstown is the port of call for many trans-Atlantic steamers.

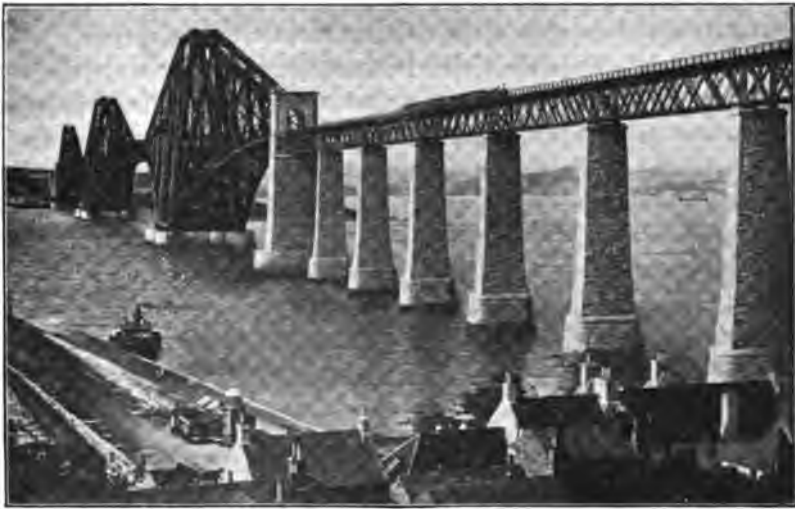
Transportation The transportation facilities of the Kingdom are not surpassed by those of any other country. Excellent carriage roads extend everywhere, and the numerous railways join all towns with important centers of trade, and these with the great commercial and industrial centers. The railways are of the highest order of excellence, the best of mail, telegraph and telephone services are also maintained, and ocean cables extend to all parts of the world.

Commerce The British Isles are situated in the center of the land masses of the Northern Hemisphere. Commercially, this is a great advantage. Moreover, their small area places nearly every important manufacturing and commercial town within 50 miles of the sea. And, in addition to these local advantages, the British Empire has colonies in all parts of the world, with each of which most favorable trade relations are sustained. These conditions have made the United Kingdom the greatest com-



A VIEW IN THE DOCKS, LIVERPOOL

mercial and carrying nation of the world. The British merchant marine far exceeds that of any other country. It has nearly three times the tonnage of the merchant marine of the United States, and more than five times that of any other European nation. Her merchant-ships are a great source of wealth, as they enable her to do a large part of the carrying business of other nations, especially the United States, and from this carrying trade a valuable revenue is derived. English ships are found in every important port of the world.



THE TAY BRIDGE

Commerce is carried on with nearly all nations, but the United States, France, Germany, Netherlands, Belgium and Russia, in the order named, have the largest trade. The imports are food stuffs and raw material for use in manufacturing. For this reason Great Britain has for many years been a free trade country, since, to place duties upon such imports would simply increase the cost of living, and cause hardship to the people.

The exports are manufactures and coal. English textiles are found in all lands and English hardware, cutlery and machinery are exported to the British colonies and many of the countries of Europe and Asia. In addition to this, innumerable small wares, such as scientific instruments, pens, needles and pins and others that in the aggregate amount to a large sum, are sent to nearly all countries with which trade relations are sustained. The whole amounts to about two and a half billion dollars, one-fourth of which comes from the colonies, one-fifth from the United States, about one-tenth from France and the balance from other countries.

The imports from the United States are wheat, flour, preserved meat, beef cattle, cotton and electrical machinery. The exports to this country consist of textiles and other manufactures. The annual trade with the United States amounts to \$716,333,333, of which about \$525,000,000 is in imports from this country, and the balance in exports.

QUESTIONS.

In what lines of agriculture does England excel? Why?

What made England for a long time the leading manufacturing country of the world?

How do you account for the number of large cities in England and Scotland? Why is the northern portion of Scotland sparsely populated?

What has given London its prominence as a financial and a commercial center? What city in the United States does it resemble in these respects?

What conditions have made Liverpool such an important seaport?

What natural advantages have aided in extending the commerce of the United Kingdom?

Why is such a large proportion of the foreign commerce carried on with the United States?

CHAPTER VI.

THE GERMAN EMPIRE.

The German Empire is the most centrally located of any of the countries on the continent of Europe. It adjoins Russia on the east, Austria and Switzerland on the south, France, Belgium and the Netherlands on the west and Denmark on the north, and is within a day's sail of the British Isles and the Scandinavian Peninsulas. Its area is about three-fourths that of Texas, and its population two-thirds that of the United States. In the south the land is high and often mountainous, and the hill country prevails until the plains of Russia are reached. These occupy the entire northern half of the Empire. The country has a temperate climate and an abundant rainfall. The people are vigorous, industrious, highly educated and employ the most scientific methods in all their industries and occupations.

Agriculture Agriculture is second in importance to manufactures and is one of the leading industries, engaging the attention of two-fifths of the people. Though in many localities the soil is naturally poor, yet owing to the great care taken with every little patch of ground and the skill with which the Germans manage, abundant crops are raised. In the southern and central parts of the Empire rye, hops, grapes, wheat, barley and tobacco are raised, and the Rhine Valley is one of the largest wine-producing regions in the world. On the plains of Prussia, sugar-beets, rye, oats and tobacco are raised. The sugar-beet is one of the most important crops and Germany is the leading country in the production of beet-sugar, its output being about one-fourth of the world's supply. Potatoes are also important. But none of



THE DOCKS, HAMBURG

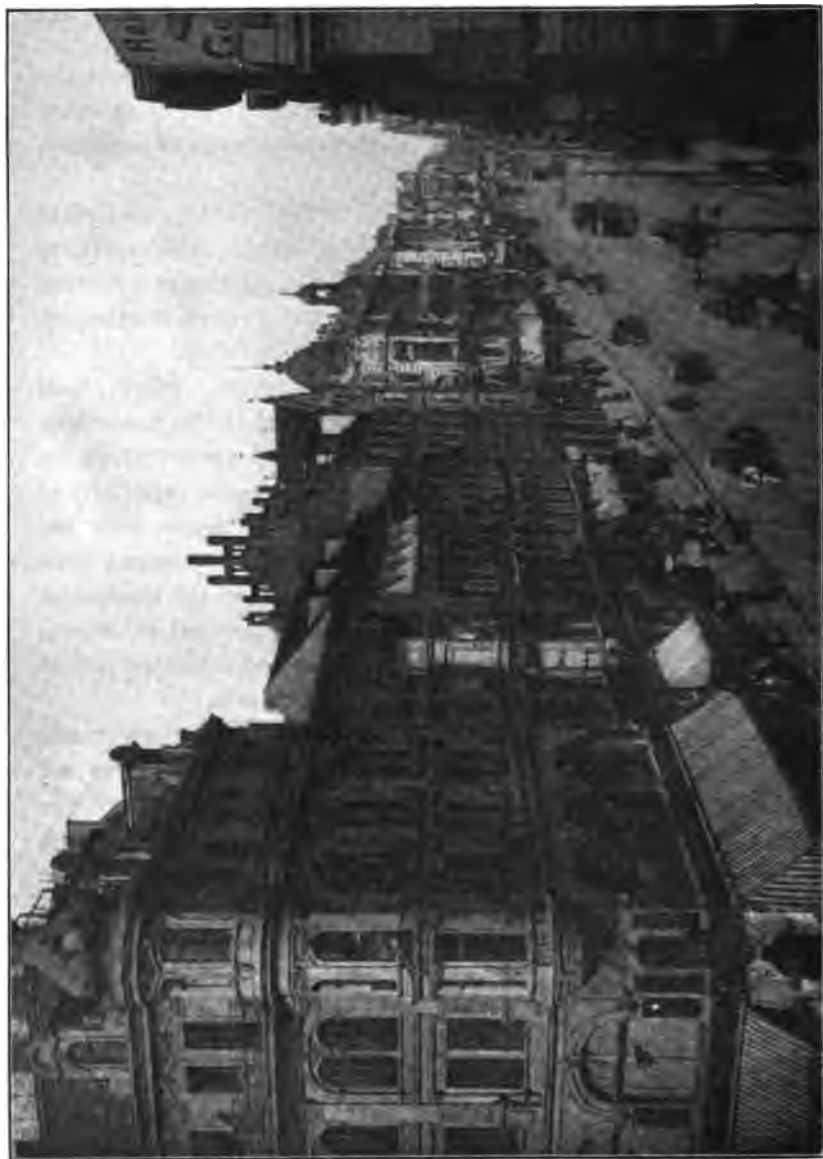
these crops is sufficient to supply the country with food and the balance has to be imported. Cattle and hogs are raised in some sections and where grazing is good, dairy products are of considerable value.

Forests cover one-fourth of the area of the country, and yield a good supply of timber and other useful products. All forests are under government supervision and their wise management prevents waste or destruction. A tree cannot be cut unless another is planted, so that the supply of timber does not diminish.

Mineral Resources Germany is rich in minerals. Silver, lead and copper ores are found in the mountains of Prussia, extending from Aachen on the west to upper Silesia on the east. Coal and iron occur in the Rhine Highlands, especially in the Ruhr Valley in the neighborhood of Aachen, where they become continuous with the coal fields of Belgium. Germany produces more coal and iron than any other country on the continent. She also leads the European countries in her output of silver. Zinc occurs in large quantities, copper is mined to a limited extent and most of the lithograph stone comes from Bavaria.

Manufactures As a manufacturing country Germany ranks third, being exceeded by the United States and the United Kingdom. Textiles and iron and steel goods are the leading products. These industries are principally located in the iron and coal regions of the south and southwest. At Essen are the Krupp Iron Works, which are the largest of the kind in the world. Here are cast most of the large cannon for Germany and other countries, and here also is made much of the machinery for the largest ocean steamers; other heavy iron and steel work is also turned out in abundance.

The Germans are skilful in the manufacture of scientific instruments and supply not only the home market, but to a large extent that of every other country. They also excel in the manufacture



FRIEDRICHSTRASSE, BERLIN

of chemicals used in the arts. Most of the aniline dyes, much of the perfumery and many other similar compounds come from German cities. Large quantities of beer and other malt liquors are also manufactured. In the mountainous regions a great deal of this work is done as home industries, and wood-carving and the manufacturing of wooden toys are also carried on in a similar manner. The German workmen are all thoroughly trained in their arts and are well educated, and this is one of the great reasons for the Empire's rapid advance in manufacturing industries since the Franco-Prussian War.

Transportation All the important rivers are navigable, and are connected with each other by canals. Other canals also connect with the important rivers of France, Russia and Austria-Hungary, so that the inland water transportation is ample and cheap. Railways connect all towns of importance, and, in addition, important trunk lines lead to the prominent trade centers of all surrounding countries. Over 32,000 miles of railway are in operation, and the railway system of the Empire is second only to that of the United States. The Baltic and the North Seas have 700 miles of coast, and the construction of the Kaiser Wilhelm Canal (see page 29) across the Peninsula of Schleswig-Holstein is of great advantage to commerce on the Baltic, since it saves the long and stormy passage of the Straits between Denmark and Scandinavia. The merchant marine is one of the best in the world and contains some of the largest and finest ships afloat, such as the *Kaiser Wilhelm* and the *Deutschland*. The leading steamship lines are the Hamburg-American and the German Lloyd.

Cities Berlin, the capital, is one of the few cities having over a million inhabitants. It is an important industrial center and the leading financial center of the Empire. It is also one of the most important financial centers of the world. Many of the



ALTMARKT. DRESDEN

leading railways converge here. Hamburg, at the mouth of the Elbe, has extensive docks, and is the most important seaport on the continent. It receives all the American trade. Dresden is the center of the railway system of Saxony, and also has steamer connections with most of the leading ports of Europe. It is likewise an important manufacturing center. Königsberg and Danzig are important Baltic ports. Breslau receives most of the raw material of Eastern Europe. Settin and Kiel have large shipyards where many of the finest German ships are built.

Commerce The commerce of Germany ranks among European countries next to that of Great Britain. Her excellent manufactures find a market in all civilized countries, and her important exports consist of iron and steel goods, textiles, chemicals, beet sugar, dye stuffs, wine and scientific instruments. The leading imports are food stuffs, raw material, especially cotton, wool and raw silk. Germany is a heavy purchaser of American cotton, although she obtains considerable of her supply from other countries. The raw silk is nearly all obtained from Italy. Large quantities of her textiles go to South American countries and considerable wheat is imported from Argentina. The United States, Austria-Hungary and Russia are also important sources of grain supply.

The annual trade with foreign countries amounts to about \$2,500,000,000; about one-half of this is with Great Britain and United States; and Russia, the South American States, Netherlands, France and Belgium are the other leading countries. The annual trade with the United States is about \$313,000,000. The imports from this country exceed the exports to us by about \$73,000,000. We obtain from Germany chemicals, woolens and scientific instruments, and send her dressed meat, boots and shoes, cotton goods, agricultural machinery, typewriters and a few other manufactured articles.

QUESTIONS.

How does the German Empire compare with the United Kingdom in area? In natural resources?

How do German manufactures compare with those of England in kind and quality? Along what lines do the Germans excel? The English?

In what lines of manufacture does Germany compete with the United States?

Why is Germany so successful in securing foreign trade? Could her plan be followed with profit by the United States?

How does Hamburg compare with Liverpool as a seaport?

CHAPTER VII.

FRANCE.

The Republic of France is south of the British Isles and southwest of Germany. In the northeast it adjoins Belgium and on the southeast Italy. Its area is a little less than that of Germany, and its population a little less than half that of the United States. The southern and eastern portions are mountainous, but the northern and northwestern portions are quite level, forming a part of the great plain that extends along the western coast of the continent. All the rivers have their source in the mountains. The climate is warm temperate, quite similar to that of the South Atlantic States. The country has a fertile soil, but the mineral resources are comparatively small.

Agriculture Four-fifths of the land is divided into small farms which occupy one-half of the inhabitants. Though smaller than Texas, France has as many farms as the United States. They average in size from fifteen to seventeen acres and are cultivated on the plan of intensive farming, as in England. The most scientific methods are employed, and the land is in the highest state of fertility. Wheat is the most important cereal and the crop is of greater value than those of all the other cereals combined. Oats is the next cereal in importance, and rye and barley are grown to some extent. The sugar-beet is the most valuable agricultural product and is raised extensively on the plains in the north. France has over 500 sugar factories and produces about 833,000 tons of sugar annually. Tobacco is grown in some provinces, and is a government monopoly.

France is the leading country of the world in the production

of grapes and wine ; the soil and climate of the southern and eastern portions of the country being especially adapted to this industry, and French wines are exported to all parts of the world. Champagne and red and white wines are the principal varieties shipped. Grazing is the most important industry in the northern part of the country where cattle-breeding and dairying are a fruitful source of income to the farmers. Wool of excellent quality is also grown, and France is the original home of the Flemish and Percheron horses.

Fisheries The fisheries are among the first in Europe ; large quantities of cod are taken, and oyster culture is extensive. Most of the Atlantic fisheries are around the mouth of the Gironde, and most of the oyster beds are on the Bay of Biscay off St. Malo and in the English Channel. French oysters are inferior to the American varieties, but they find ready market at home.

Mineral Resources France produces considerable coal, but not enough to supply her demands. Iron ore is also mined to some extent on the German frontier. The leading iron manufactories are Lille, Nancy and St. Etienne. Salt mines occur near Nancy, and large quantities are also obtained from the salt marshes along the Loire and Gironde.

Manufactures France is an important manufacturing country ; although, in amount, her manufactured products fall far short of those of the United States, Great Britain or Germany, she excels in the quality of her goods. Shops and factories are found throughout the country, but the most extensive manufactories of iron and steel are in the north, in the region of the coal fields. The manufacture of textiles is one of the most important industries, and occupies over a million people. The silk industry centers in the Rhone valley, and Lyons is the leading silk market and the largest producer of silk textiles in Europe. The silkworm has been cultivated in Southern France for several centuries, but

nine-tenths of the raw material is imported from Italy, China and Japan. Rouen has large cotton mills and Lille and Roubaix are also important centers of this industry. Excellent woolens are made at Roubaix and Tuscany, and Rheims and Lyons manufacture shawls. French woolens are noted for their fine texture and superior quality. Ribbons, kid gloves, hats, millinery, perfumery and numerous small wares, for the making of which the French people have a special aptitude, also constitute an important part of the manufactures.

Transportation France has an excellent railway system, of which Paris is the largest center. From here, railways extend to all of the principal industrial and commercial centers in the northern part of the country, and important lines extend south to Lyons and Marseilles. In all, there are about 24,000 miles of railroad, and a trunk line through the Mount Cenis Tunnel makes direct connection with Italy. The navigable rivers have been canalized, thereby greatly extending their mileage. Canals also connect these rivers with each other and with some of the rivers of Germany, forming a complete and extensive system of inland waterways.

Cities Paris is the largest city on the continent, the commercial and financial center of the country and the focus of a vast trade with surrounding countries as well. It has railway connections with all the important cities of Europe, and, through the Seine, excellent water communication with Great Britain and the continental seaports. It is the center of art and fashion and has become the great center for the distribution of luxuries of the civilized world. Paris is also famous for its manufacture of women's apparel, kid gloves, perfumery, porcelain and jewelry.

Lille, on the northern plain, is an important textile center. Rouen is the center of cotton manufactures and Lyons of the silk industry. The important seaports are Marseilles, Narbonne and

Cette on the Mediterranean, Bordeaux on the Atlantic, and Havre, which is the seaport of Paris. Rouen, by the excavations in the Seine, has also been made an important inland seaport. The importance of Marseilles has been lessened by the construction of the Mount Cenis, Saint Gothard and other tunnels through the Alps, since these give the country to the north direct railway connection with Genoa and other Italian cities.



A VIEW ON THE SEINE, PARIS

Although a compact country, France presents a great variety of soil, climate and productions. The natural versatility of the French people enables them to adapt themselves to these conditions in a manner that assures success in whatever they attempt. They are full of life, open-hearted and honest, but withal energetic and earnest. Neatness and thrift characterize their every effort, and in France a larger proportion of homes is owned by their occu-

pants, than in any other country. The thrift of the French is also manifested in their use of raw material. Nothing is wasted, and what is often rejected by other nationalities as worthless is here worked up into valuable by-products. The country has been burdened time and again by heavy debts, yet the people are prosperous, hopeful and happy.

Commerce The most important articles of commerce are woollens, silk and wine. Following these are numerous small articles, such as millinery, perfumery, porcelain and scientific instruments. The imports consist of bread stuffs, raw cotton, raw silk and wool. The greatest trade is with Great Britain, Belgium standing second, Germany, third, and the United States, fourth. About one-ninth of the foreign trade is with this country. The total value of the foreign commerce is about \$1,325,000,000. France imports from the United States goods to the amount of \$77,500,000, and exports to us merchandise to the value of \$91,000,000; that is, she receives about one-twentieth of our exports and supplies us with one-eleventh of our imports.

The colonial possessions of France exceed the entire area of the United States and her possessions by more than a million square miles and contain a population of over 56,000,000, and they must be taken into account in considering the commerce of the nation. The most important colonies from a commercial point of view are Algeria and French Indo-China. The trade with Algeria amounts to about \$80,000,000, and that with the other colonial possessions to about \$60,000,000 annually.

With the exception of Algeria and Guiana, none of these colonies is at all developed, but all of them are susceptible of development, and some of them, such as French Kongo and Madagascar, contain abundant resources, while the agricultural possibilities in all are of importance and others will in time furnish opportunities for the establishing of manufacturing enterprises.

QUESTIONS.

Why is France able to support so large a population?

How do her methods of agriculture compare with those of England?

How do the manufactures of France compare with those of Germany as to kind, amount and quality?

Why is so large a proportion of the foreign trade with Great Britain?

Why is so small a proportion with Germany?

What are the means of communication with the countries to the south?

CHAPTER VIII.

BELGIUM, NETHERLANDS, DENMARK, NORWAY AND SWEDEN.

Belgium, Netherlands and Denmark occupy a section of the plains extending along the west coast of Europe, and a portion of Belgium and Netherlands is below sea level. In Netherlands, considerable of this land has been reclaimed by building dykes and pumping out the water with windmills. On the low sand-barrens along the coast of Belgium, a similar work has been done by planting a grass that holds in place the sand which was formerly drifted by the wind.

BELGIUM Belgium is one of the smallest, most populous and most enterprising states in the world. With an area somewhat less than that of Maryland, the country supports a population of more than 6,250,000. The southern portion is high and broken, and the northern, low and nearly level. Though naturally unproductive, by skilful tillage and the use of fertilizers, the soil has been made to yield abundant harvests. The sandy places along the coast have been transformed into excellent grazing lands and support large numbers of horses, cattle and sheep of the best breeds. This region is also the center of an important dairy industry. Within this belt is one of more fertile soil, on which grains, the sugar-beet and flax are raised. The flax crop is very important since the fiber is of the best quality and is manufactured into textiles in the country.

There is quite an extensive coal field in the southern part of the country, and deposits of iron are also found in the same locality. Most of the coal mined is consumed by home manufac-

tories, but a little is exported to France. Extensive zinc mines occur in Moresnet, and the production of metals and ores is an important industry. The southern part of the country is devoted to manufactures and is an important industrial center. The manufacture of cotton, woolen and linen goods and lace are the leading



A VIEW ACROSS THE BASIN, ANTWERP

industries. The hand-made lace of Belgium is famous for its fineness and beauty, and commands a high price in all civilized countries. Porcelain, art-tiles, glassware and cheaper grades of all crockery are also made in large quantities in the coal region. All of these constitute important articles of export.

Brussels, the capital, is the most important city. Antwerp

is the principal port and one of the chief seaports of Europe. Verviers, Liège and Seraing are important centers of the metal industry. Ghent is noted for its linens, and Mechlin and other towns in its vicinity for laces. The country is well supplied with railways which are under the control of the state. The Scheldt is navigable for ocean vessels as far as Antwerp, and is also connected by canals with the Rhine, which in turn is connected with the rivers of France.

Most of the foreign commerce occupies the surrounding European countries and the United States. The imports are food stuffs, and raw materials used in manufactures, especially cotton and wool, and the exports are manufactured goods, including iron and steel goods, zinc, textiles, porcelain, glassware and coal. The greater part of the commerce is with France, followed by the United States, Germany and Great Britain. From the United States Belgium receives wheat, cotton, corn and petroleum. The amount of trade is about \$100,000,000 annually, of which \$47,000,000 are imports and the balance exports.

NETHERLANDS A large part of the Netherlands is the delta of the Rhine. The country is about the size of Maryland, and has a population of about 5,000,000, or about equal to that of Canada. Agriculture, dairying and stock-raising are the most important industries. The soil and climate make grazing profitable, and the country is celebrated for its excellent breeds of cattle, horses and sheep. Agriculture takes the form of truck-farming and the growing of flowers, and the Dutch farmers supply vegetables, bulbs and cut flowers to many of the European cities.

Manufacturing is next in importance and consists of the making of cotton, woolen and linen goods, sugar, chemicals, agricultural implements, metal work, brick and pottery. Sandstone is quarried, and iron ore and coal are mined in small quantities.

The country is well supplied with canals, varying in size from those that will float large ships to mere ditches. These connect with the navigable rivers and with each other and furnish a complete system of waterways, which are supplemented by a railway system, having about half the mileage of the canals.

Amsterdam is one of the leading financial centers of Europe, but the carrying trade centers about Rotterdam, which, by improvement of its canals and rivers, has been transformed into a commodious seaport. Delft has a world-wide reputation on account of the pottery made there. The trade is principally with the surrounding nations and the Dutch colonial possessions. The leading exports are butter, cheese, sugar, vegetables, flowers, margarine and flax. The imports are food stuffs, raw materials and manufactures. Most of the exports go to Great Britain, Germany, France and Belgium. The trade with the United States is small, amounting to about \$101,600,000 a year, more than three-fourths of which is imports. Like England, Netherlands has for centuries been a jobbing nation. The volume of trade handled by her people amounts to nearly \$1,500,000,000 a year. The Dutch merchant marine is large for the nation, well equipped and frequents all ports of the world. Much of the carrying trade is done for the Dutch East Indies, whose population and commerce exceed in value those of the mother country.

DENMARK Denmark occupies the peninsula of Jutland and a few adjoining islands. In area it is a little larger than Massachusetts, Connecticut and Rhode Island combined, and its population is about two and one-fourth millions, which is a little more than that of Chicago. Agriculture occupies about one-half of the people, manufacturing one-fourth, and fishing and trade the remainder. All available land is under cultivation, and excellent crops of wheat and other cereals and roots are raised. Raising live-stock and dairying are also important industries. In the quality of

her butter, Denmark excels all other countries. Manufactures are encouraged, but they are few and unimportant. The largest trade is with Great Britain and Germany. The exports are butter, eggs, lard and pork. The imports, food-stuffs and manufactured articles, principally textiles and hardware. Considerable trade is carried on with Iceland, from which fish, whale and seal oil are imported. Copenhagen is the capital and commercial center.

NORWAY AND SWEDEN Norway and Sweden occupy the Scandinavian Peninsula, the greatest part of which is a plateau, varying from 1,000 to 3,000 feet in altitude, being highest at the South. The combined area of these countries is 298,000 square miles, of which 125,000 belongs to Norway, and 173,000 to Sweden. Norway is a little larger than New Mexico, and Sweden is about the size of California and Maryland combined. The population of Norway is a little more than 2,250,000 and that of Sweden is 5,000,000.

The coast of Norway is indented by numerous deep fiords, many forming good harbors. The southern and eastern slopes contain considerable lowland and the streams are small and rapid, affording good water-power, but being of little assistance to navigation. One-half of Sweden, and over one-fifth of Norway are covered with forests. Spruce, fir and pine predominate. Their latitude would give these countries an extremely cold climate, but under the influence of the winds from the Atlantic, this is modified to a cool temperate over most of the peninsula.

Until 1905 the two countries were under one government, but maintained separate legislative assemblies. Their industries are common, but Norway, being the more mountainous, gives less attention to agriculture than Sweden. The leading agricultural products are oats, rye, barley and potatoes. Considerable stock is raised, and dairying is also less important in the low lands of the south. Ores of copper, silver, lead, iron and zinc are found, and

mining is an important industry in both countries. The iron is of superior quality, and is exported to all iron-manufacturing countries. There is but little coal on the peninsula.

Manufacturing industries are few. The most important is lumber and lumber products, the Scandinavian countries being the



NORWEGIAN FISHERMEN DRYING FISH

largest exporters of lumber in Europe. Matches and wood pulp are made and exported in large quantities. Iron manufactures are second in importance. The manufacture of textiles is limited.

The trade is with Great Britain, Germany and Denmark. Only a small portion of the trade is with the United States. The exports are lumber, pig iron, dairy products, matches and wood pulp. The inhabitants of Norway are extensively engaged in fish-

ing, and export cod and cod-liver oil. The imports are some food-stuffs and manufactured goods, principally textiles and machinery.

The leading cities are all seaports. Christiania, the capital of Norway, is at the head of the Skager-Rack; Stavengar, Bergen, Tromso and Hammerfest, the most northerly town of Europe, are important trade centers of Norway. Stockholm, the capital of Sweden, has an excellent harbor on the Baltic, and is the commercial and financial center of the country. Goteborg and Halmestad on the Cattogat are also important ports. The leading cities of both countries are connected by railway, there being about 7,000 miles on the Peninsula.

Scandinavians are excellent sailors, and their ships are found in all the leading ports of the world, and, in proportion to its population, Norway has the largest merchant marine of any nation. But the Scandinavians do not confine their energies solely to developing the resources of their own country and carrying goods for other peoples. Thousands of them have emigrated to the United States and other countries, where they have taken up land and become successful and prosperous farmers. Still others have been equally successful in following the various trades and professions in the land of their adoption. Wherever found, they are sober, energetic and industrious.

QUESTIONS.

Why does Belgium excel as a manufacturing instead of as an agricultural country?

What gives Antwerp its importance as a seaport?

What does the word *Netherlands* mean? Why is the name appropriate to the country?

In what respects are the United Kingdom and Netherlands alike commercially?

What has given Holland linens their wide reputation?

Why does the United States import iron from Sweden? What other articles do we import from this country and from Norway?

Why are there so few large cities in Norway and Sweden?

CHAPTER IX.

AUSTRIA-HUNGARY AND SWITZERLAND.

AUSTRIA-HUNGARY The combined area of Austria-Hungary is a little less than that of Texas, while its population is 45,000,000, or more than half that of the United States. Austria, which is the smaller of the two states, is mountainous, and Hungary consists of broad grazing plains, or steppes, which are a continuation of those of Russia. Austria has a mild climate with abundant rainfall, but the climate of Hungary is subject to extremes of heat and cold, and the rainfall is less than that of Austria.

Agriculture Agriculture is most extensively practised in Hungary; cereals and live-stock are the leading products. The climate is well adapted to wheat, and large quantities of this grain of excellent quality are raised. Most modern methods of cultivation and improved agricultural machinery and implements are in use in connection with this industry. The cultivation of grapes and prunes is quite extensive in the highland region of Austria. Large quantities of sugar beets are also grown, from which sugar for export is manufactured.

Forests cover a little more than one-fourth of the area, and yield a variety of good timber and other forest products of considerable value.

Minerals Coal and iron abound in the northwestern part of Austria, but not in close proximity. Salt is mined in the Alpine provinces and in Transylvania. Austria is also one of the leading countries of Europe in the production of gold, and some silver and mercury are mined.

Manufactures The manufacturing industries center around the region of Bohemia, Moravia and Silesia, where woolen, linen and cotton goods are made. The making of art-glassware, in which the Bohemians excel, is an industry of great importance and one which for centuries has furnished a large revenue. Porcelain is also manufactured. Sugar-refining and the manufacture of wheat-flour, in which Austria-Hungary rivals the United States, are among the important industries. The present process of making wheat-flour by roller mills originated in Hungary.

Transportation The Danube and Elbe are the great natural waterways to the Black and Baltic Seas. Canals unite these rivers, so that there is a continuous water passage between these seas. The Ludwig Canal in Germany also connects the Danube with a navigable tributary of the Rhine. There are 23,000 miles of railway in operation, most of which is under the management of the state. Transportation facilities are fairly good, but not equal to those of the United Kingdom, or of France and Germany, and rates are so high as to cripple industries.

Vienna, the capital and great financial center of Central Europe, is situated on the Danube, at a point where a series of passes in the Carpathian and Alpine Mountains gives it railway connection with the adjoining countries, Germany, Switzerland and Italy. It is one of the most important financial and industrial centers of Europe. Budapest is the commercial center of Hungarian trade. Trieste and Fiume, on the Adriatic, are the only seaports.

Commerce Most of the trade is with Germany, Great Britain and Italy, and nearly all goods are transported by railway and canal, less than one-third passing through the seaports. The exports are food stuffs, eggs, barley, malt, woolens, glassware,

timber and wood-work. The imports are cotton, wool, silk and agricultural machinery. The United States buys of Austria-Hungary glassware and porcelain, and sells her cotton goods, pork, agricultural machinery and corn. The annual trade with this country is about \$18,000,000, of which \$7,000,000 are imports from us, and the remainder exports.

SWITZERLAND Switzerland is an inland mountainous country lying wholly within the Alps. Its area is about twice that of Massachusetts, and its population is about 3,500,000. Seven-tenths of these are German, and less than one-fourth of them French. It is the land of lofty mountains, deep valleys and beautiful lakes and is famous the world over for the beauty and grandeur of its scenery. The valleys are fertile and wheat and other cereals and some vegetables are raised, but the supply is not sufficient to meet the needs of the people. The mountain farmers make excellent cheese, some of which is exported.

Switzerland is a manufacturing country, and most of its industries are highly specialized. The making of watches is the leading industry. Most of the work is done by hand, and, until the advent of the American machine-made watch, the Swiss watchmakers supplied the trade for many countries. Cotton and silk fabrics, and buttons and embroidery are also made. Many of the Swiss are skilled in engraving on wood, and produce beautiful and valuable specimens of art work. The exports are manufactured goods, and some condensed milk. The largest trade is with Germany, followed by Great Britain and France. Trade with the United States is inconsiderable. The Mount Cenis, Saint Gothard and the Simplon tunnels are of great advantage to the country because they have made transportation much cheaper, and given direct railway connection with surrounding states.

Geneva, at the head of the Rhine, is the chief trade center, and is noted for the manufacture of watches. Basel is the

center of the silk industry, and Zurich has important cotton factories.

QUESTIONS.

How does the wheat industry of Hungary compare in extent with that of the United States? Which country excels in the manufacture of flour?

What has given Vienna its financial and commercial importance? How does it compare in wealth and influence with Berlin? With Paris? With New York?

Why does Austria-Hungary have so small a trade with the United States?

What has made Switzerland so well known in the United States? Is this acquaintance of any commercial advantage to either country?

CHAPTER X.

SPAIN, PORTUGAL AND ITALY.

SPAIN AND PORTUGAL These countries occupy the Iberian Peninsula. Their surface is rough and mountainous, and with the exception of small areas around the coast, the land is high. The climate is semi-tropical, except in the highest altitudes, and the rainfall is not sufficient for extensive agriculture. Spain is about the size of California and Kentucky, and has a population of about 19,000,000, while Portugal is a little smaller than Indiana and has a population of 3,500,000. Though politically separate, industrially and commercially these countries are one.

The important agricultural products are merino wool, which is the finest in the world, and tropical fruits, including raisins, grapes, oranges, lemons, limes and olives, all of which are exported. Wine making is also an important industry, and a large share of the supply of cork comes from the interior. This is obtained from the bark of the cork oak, which grows nearly a foot thick.

There are good supplies of minerals, and the mines have been worked for centuries. Silver, iron ore and coal are obtained in paying quantities, and about one-half of the world's supply of quicksilver comes from the mines of Almeda in Spain. In general, the crudest methods are followed in mining and the reduction of ores, and the mineral resources are only partially developed. Manufactures are too limited to deserve any special notice.

The leading exports are wine, fruits, iron ore, merino wool and Malaga raisins, from Spain; and the export for which Portugal is

the most celebrated is Port wine, which obtains its name from the city of Oporto. Barcelona is the financial and commercial center. Madrid is the capital of Spain, is of political significance, but has no commercial or financial importance, and the principal fruit ports are Malaga, Valentia and Cartegena.

ITALY A good portion of Italy is formed by a spur of the Alps which extends into the Mediterranean, and is known as the Apennine Mountains. In area the country is about equal to Nevada, and it has a population of about 7,750,000, or a little more than that of the state and city of New York combined. The northern part of the country forms the southern slope of the Alps which descend to the Plains of Lombardy, through which flows the Po. The basin of this river is alluvial land of remarkable fertility. The Apennines extend through the central part of the Peninsula, and slope on both sides to the sea. Italy has the same latitude as the New England States, but its climate is much warmer and somewhat more arid.

Agriculture Italy has at all times been distinctly an agricultural country. The great Plain of Lombardy is the most important agricultural district. Its ranges of latitude and altitude enable the country to produce all of the crops of the temperate regions, and many tropical products as well, and the seasons are such that two, and even three, crops can be obtained during the year. Wheat is the most important cereal, but there is not enough produced to supply the needs of the population. Corn is raised in large quantities, and rice is grown in the irrigated regions. Olives constitute the most important of the agricultural products, and Italy leads the world in their production. Olive oil is extensively used by the inhabitants in place of butter, or other fats. Large quantities of the fruit and oil are also exported. Tropical fruits, oranges, lemons and grapes are extensively cultivated, and Italy ranks next to France in the production of wine.

The most important single industry is silk culture, in which Italy is one of the leading countries of the world, ranking next to China and Japan. The industry is located principally in the northern part, where the mulberry thrives and the climate is especially suited to the growth of silkworms.

Notwithstanding the natural advantages of soil and climate, the Italian farmers are mostly poor, and receive but small returns for their arduous toil. Most of the land is owned by wealthy landlords, who rent it on such terms that the tenants are continually at a disadvantage and the methods employed in working the land, as well as the implements used, are of the most primitive sort.

Minerals The mineral industries are few. Carrara marble is the most choice stone for statuary purposes, and is exported to all countries. Most of the world's supply of sulphur is also obtained from the Island of Sicily, and some other volcanic regions. Iron ore is found in some localities, and is now being successfully worked under the fostering care of the government.

Manufactures The absence of coal limits the manufactures to textiles and straw goods, but the iron industry is being developed. The Italians have a special aptitude for the fine arts, and statuary, coral ornaments, mosaics and jewelry are the most important articles of manufacture. All these, on account of their excellence, command a high price in foreign markets. Much of this work is done in the homes of the workmen. There are but few large factories, or shops, even, employing any number of workmen. Macaroni, the most of which is consumed at home, is also produced in large quantities.

Transportation Italy occupies a central position on the Mediterranean. She has an abundance of sea coast and numerous good harbors. The other ports of the Mediterranean, as well as those of the East, are easily reached from her shores, and these advantages have given her a large carrying trade

and a goodly number of Italians follow the sea. The country also has a good merchant marine. There are about 10,000 miles of railway, which are organized into trunk lines extending along either coast. By means of the Mt. Cenis, St. Gothard and Simplon tunnels, trunk lines also connect Italy with France, Switzer-



DRYING MACARONI

land and the important centers of Europe, such as Vienna, Berlin and Paris. On account of these advantages most of the export trade is by rail.

Cities Rome, the capital, contains the Vatican, which is the residence of the Pope, and is the center of the Roman Catholic Church for the world as well as the center of government for the kingdom. It is more celebrated for its historic and artistic

associations than for its commercial importance. Genoa and Venice are the most important seaports. In the fourteenth century Venice was the commercial center of the world, but with the change in commercial routes she lost her prestige. Milan, in the northern part of the kingdom, is the great inland commercial city and the largest railway center of the country. Florence is noted for its art works. Palermo is the commercial center of Sicily, and Colonia, Brindisi and Ancona are important ports on the Suez Canal route.

Commerce The annual exports amount to about \$284,000,000, and the imports to \$342,000,000. The exports are raw silk, olives, sulphur, marble, art works and textiles. The silk and art goods go to France, the United States and Switzerland and some of the cotton goods go to Turkey. The imports are cotton from Egypt and the United States, wheat from Hungary, manufactures and textiles from Great Britain and Germany. In the foreign trade Germany ranks first, followed in order by Switzerland, France, Great Britain and the United States. The exports to this country amount to about \$63,333,000 a year, and the imports from us to about \$35,000,000. We buy the Italians' art goods and Carrara marble, olive oil and straw goods, and sell them cotton, agricultural implements, machinery and hardware.

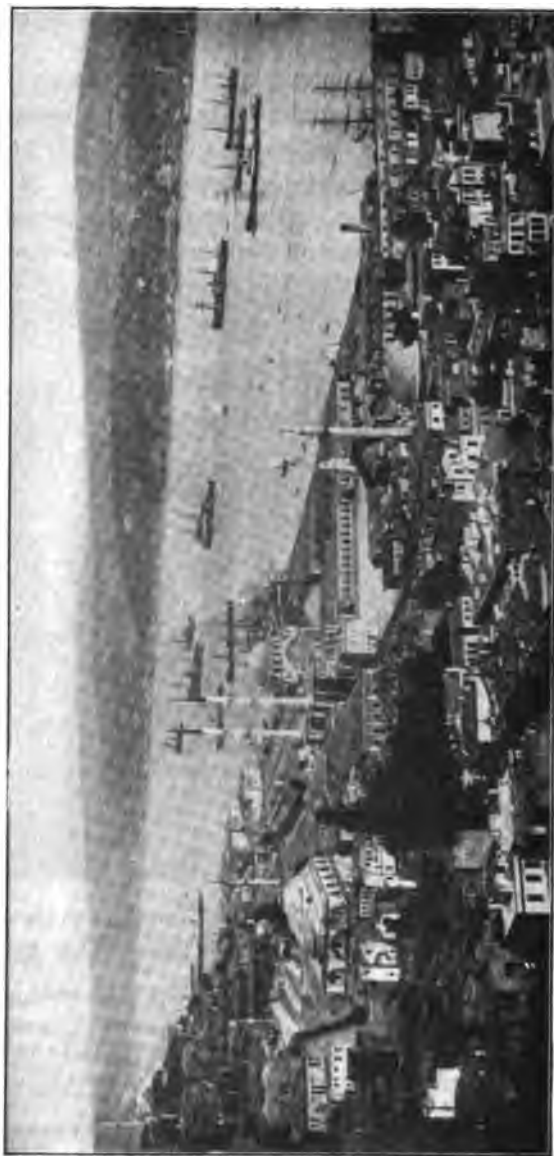
QUESTIONS.

What is the difference between the agricultural methods employed in Spain and those in vogue in France and Germany? What is the cause of the difference?

Why are there so few manufactures in Spain and Portugal? What effect has this condition upon the commercial interests of these countries?

How do the agricultural methods employed in Italy compare with those in the United States? Would the Italians be successful farmers in the United States?

What commercial advantages does Italy derive from her geographical conditions?



PANORAMA OF THE BOSPORUS

CHAPTER XI.

THE BALKAN COUNTRIES.

These countries occupy the Balkan Peninsula and contiguous territory. They are Greece, Roumania, Servia, Montenegro, Bulgaria and Turkey in Europe. Except Turkey, they are all small and commercially unimportant.

GREECE Greece occupies the southern end of the Balkan Peninsula. It is rugged and mountainous, with a deeply indented coast. The area is about the same as that of West Virginia, and its population is about equal to that of the city of Chicago. Agriculture occupies one-half of the population. Fruit is the most important crop and Greece is one of the largest producers of currants. Ores of lead and zinc are also exported. The manufactures are unimportant. The country does considerable of the carrying trade for the eastern Mediterranean. The Corinth ship canal, four miles long, shortens the route between Adriatic ports and Western Europe by several hundred miles. Most of the commerce is with Great Britain, France and Russia, that with the United States amounting to only \$2,000,000 a year.

**ROUMANIA
AND BULGARIA** These countries occupy the basin of the lower Danube, and are the great grain producers of Europe. Wheat and corn are the principal crops. Roumania is a little smaller than New York, and has a population of nearly 6,000,000. Bulgaria is about the size of Oklahoma, and has a population of a little less than three and one-third millions. Roumania is one of the leading wheat producing countries of the continent. Besides cereals, sugar-beets, flax,

honey, tobacco, fruits and wine are produced, and coal, petroleum and salt are mined.

The commerce of the countries finds its outlet through the Danube which is the international waterway. Railways also connect the principal towns, and these with cities in adjoining countries. The chief export is grain, which goes to Great Britain, Austria and Germany.



THE HARBOR, CONSTANTINOPLE

SERVIA AND MONTENEGRO

Servia is a small country in the valley of the Moravia River. Its chief industry is growing corn and other grains, and fruit and live-stock, while ores of silver, lead, copper and iron, and some coal, are mined to a limited extent. The commerce is almost wholly with Austria.

Montenegro is a small principality between Servia and the

sea. It is mountainous, has no railways and its industries are of little importance. Stock-raising is the most important occupation, and the leading trade is with Austria-Hungary and Great Britain.

TURKEY, OR THE OTTOMAN EMPIRE

The empire of the Sultan extends from the Balkan Peninsula through Asia Minor and Arabia, and claims suzerainty over Egypt and Tripoli. European Turkey has an area of 60,000 square miles, and the Asiatic portion of the empire an area of 600,000. The entire country is in a backward condition, and but few of the industries are developed. Politically the Turkish Empire is referred to as the "Sick Man of Europe." Wheat, tobacco, cotton and roses, from which attar of roses is made, are the most important crops. Grazing is an important industry in some sections, and wool is exported, as is mohair, the wool of the Angora goat.

The leading manufactures are attar of roses, rugs and carpets. The rugs are famous for their beauty, and command high prices in all civilized countries. Constantinople is the chief center of trade, as well as the capital of the empire. It is situated on the Bosphorus and commands a strong strategic position, which gives it an importance it could not have from its commerce and industries alone. It is connected with European cities by railway and with the East by caravan routes, and carries on a trade with nearly all the countries of the world. Smyrna, on the Mediterranean, is the most important seaport, and has direct communication with most of the European ports. It is also the terminus of many caravan routes from the East. Damascus is the starting point for caravans to various sections of Asia, and Beirut is an important center for the manufacture of textiles. It is connected with Damascus by railway. Most of the trade is with European countries. The United States imports from Turkey opium, attar of roses, rugs, wool, gums, hides, silk and Turkish tobacco, to the value of about

\$4,000,000 annually. Our exports are very small, amounting to less than \$400,000 a year.

QUESTIONS.

What does the history of Greece, Roumania and Bulgaria teach in regard to industrial and commercial prosperity?

What are the chief causes of the backward condition of the Turkish Empire?

Of what importance is Constantinople as a financial and commercial center?

CHAPTER XII.

THE RUSSIAN EMPIRE.

The Russian Empire occupies one-half of Europe and Asia, contains one-seventh of the land of the globe and, in area, ranks next to the British Empire. With few minor exceptions, it is a vast plain, extending from the Baltic Sea to the Pacific Ocean—a distance of 6,000 miles—and from the Black Sea, Persia and Chinese Empire on the south to the Arctic Ocean on the north. Unlike other great empires, its territory is compacted into one great land mass between the different parts of which there are no obstructive barriers. The area in square miles is 8,666,000 square miles, and the population is over 130,000,000. The entire region is in the cool temperate and frigid zones, and the northern third is wholly unsuited to cultivation. The Empire comprises Russia in Europe, Siberia, Trans-Caucasia and Trans-Caspia.

RUSSIA IN This division comprises a little more than one-half
EUROPE of Europe, and includes about one-fourth of the area of the Empire. It is a vast plain, extending from the Black Sea to the Arctic Ocean, and from the Baltic to the Ural Mountains. The northern third is too cold for agricultural purposes. The middle portion is covered with heavy forests of valuable hard and soft woods, and the southern part is the granary of Europe. Rice, oats, wheat and flax are raised in large quantities, and Russian wheat competes with that of the United States in the markets of Europe. The land is worked on the community plan; that is, the residents of a neighborhood, or a small village, work the land in common, and each family have their proportionate share of the crops. The methods employed are

primitive and the rate of production is low. Most of the Russian farmers, or peasants, are too ignorant to compete successfully with the farmers of Western Europe or the United States.

Minerals The mineral resources are abundant. Coal is found in Poland and the basin of the Don. Iron ore occurs in Poland and various other localities, and gold and platinum are



A FLOUR MILL ON THE TRANS-SIBERIAN RAILWAY

found in the Ural Mountains, where nine-tenths of the world's supply of platinum is obtained.

Manufactures Manufactures are rapidly on the increase, and now most of the iron and steel goods and railway supplies are made within the country. There has also been a large advance in the manufacture of textiles, and Russia has become an exporter of the coarser grades of cotton and linen fabrics.

SIBERIA Siberia is a vast plain which climatically can be divided into three sections. The agricultural section of the south, the forest and mineral belt occupying the middle portion, and the frozen tundras of the north. The agricultural district has a warm and somewhat arid climate, but is well suited to growing cereals, and most other crops of the temperate latitude. For its adaptation to hard grained wheat it rivals Minnesota, Dakota and Manitoba. Some of the agricultural sections also produce oats and rice in abundance. The forest belt is a series of vast resources which have not yet been developed. In the near future this region will furnish the timber supply for Europe. In area, the forest belt is second only to that of North America. Gold and iron abound. Gold mines are also worked along the Amoor River in the northern division, which in other respects is a worthless waste of frozen tundra.

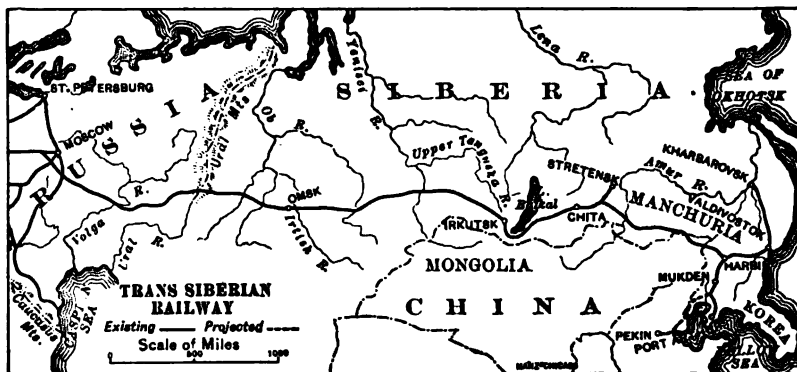
TRANS-CAUCASIA This division of the Empire lies between the Caucasus Mountains and Persia. It contains numerous fertile valleys and is almost entirely devoted to agriculture. It is also rich in petroleum. Baku on the Caspian Sea is the center of the oil fields, the annual output of which is a little more than that of the United States. The oil is transported by rail, steamer and pipe lines. Copper, salt, iron, coal and manganese are also found in Trans-Caucasia, and are mined to a limited extent.

TRANS-CASPIA This division embraces Turkestan, and the region to the north, including the basins of the Ann and Daria Rivers. Lack of moisture renders a large part of the region unproductive, and none of its resources have been well developed. The leading manufactures are cotton and silk fabrics and leather goods.

Transportation The many long and sluggish rivers of European Russia furnish an extensive system of

waterways, the Volga and its tributaries alone having over 7000 miles. These rivers have been extensively canalized, and also connected by an extensive system of canals, so that there are now almost 50,000 miles of inland waterways in the country. The ease with which canals could be constructed delayed the building of railways to a late date.

St. Petersburg and Riga on the Baltic, Archangel on the White, and Odessa on the Black Sea, are important ports, but the northern ports are closed the greater part of the year by ice, and



Odessa has an outlet to the sea only through waters controlled by other governments. Previous to the war with Japan, Vladivostock and Port Arthur, which was leased from China, were the important ports on the Pacific.

The railway system of the Empire embraces about 40,000 miles, all of which is under the control of the state. All of the leading cities of European Russia are connected by rail, and a line has been built from Baku through the entire length of Trans-Caspia; but the greatest achievement in railway building was in the construction of the Trans-Siberian Railway from St. Petersburg to Vladivostock and Port Arthur, a distance of 6,000 miles. The

completion of this road opens to settlement and usefulness the vast Siberian territory with all of its agricultural, forest and mineral resources, and places the ports of China and Japan within sixteen days' journey of Western Europe. If placed upon the map of North America, this road would extend from the extreme point of the Peninsula of Alaska to Nova Scotia. It is the longest completed trunk line of railway in the world.

Cities In addition to the seaports already mentioned, the following cities are of importance: St. Petersburg, the capital, has a population of some over 1,250,000. It is situated on the Neva, and is the farthest north of any large city. The ship canal completed in 1885 makes it a seaport, and it is also connected by canals with the large rivers of European Russia. St. Petersburg is an important railway center, and the commercial and financial center for the northern part of the Empire. Important manufactures of cotton and linen goods, also of iron and steel, are located here. Moscow is the most important railway center, and one of the largest manufacturing and commercial cities of the Empire. Astrakhan is the center of trade for the country to the south-east. Baku is the great petroleum market, and Warsaw ranks next to Moscow as a trade center.

Nijni-Novgorod is the city in which the great annual fair is held. In July of each year, the merchants from Western Europe and from Asia gather at this city for the purpose of buying and selling and exchanging goods. Nijni Novgorod is located on the great trade route where the metals and other wares of the north meet the products of the south, fish from the Caspian Sea, and tea, cotton, silk and other products from Persia, China and Japan. This fair brings together about 200,000 people from all parts of the continent, and almost everything in the line of merchandise is offered for sale. The total value of the transactions reaches about \$100,000,000.

Commerce Most of the foreign trade is with Great Britain and Germany. The exports are cereals, furs, platinum and petroleum, and the imports are raw textiles, coal and manufactures. In her trade with the United States, Russia sells us wools, skins and furs, and buys of us raw cotton and agricultural machinery. Our trade with European Russia amounts to about \$16,000,000 annually, three-fourths of which is exports. Russia's trade with the United States is small, but there is greater opportunity for the extension of American trade within this country than with almost any other. Russia needs our manufactures. The completion of the Trans-Siberian Railway, connecting at Vladivostock and Port Arthur with American lines of Pacific steamers, makes transportation convenient and comparatively cheap, and the vast resources of Russia, second only to those of the United States and Chinese Empire, afford the basis of an extensive commerce. For many years to come, she is destined to be the exporter of food stuffs and raw material, and the importer of manufactured products. By wise management the United States can secure a good portion of this trade.

QUESTIONS.

How does Russia compare, in area and population, with the United States?

How does it compare with the United States in its influence as a world power? In the extent and value of its products?

What caused railroad construction to be so long delayed in Russia? What led to the construction of the Trans-Siberian Railway?

What makes Nijni-Novgorod an important commercial center? Name and locate the other important commercial centers of the Empire.

Why is Russia's trade with Great Britain and Germany larger than that with the United States?

What are Americans doing to increase their trade with Russia?

CHAPTER XIII.

INDIA, CEYLON AND THE STRAITS SETTLEMENTS.

INDIA British India includes the peninsula between the Arabian Sea and the Bay of Bengal, and the province of Burmah extending to the east and north. Its total area is about one-half, and its population about three and one-half times that of the United States. It is the most densely populated possession of the British Empire. India is separated from the countries at the north by the great barrier of the Himalaya and the Hindu-Kush mountains. Through these extend the Khiabar and Bolan passes, affording communication with the interior. Its communication with other countries is almost entirely by sea. The mountains and the foot-hills slope down to the valley of the Ganges and Brahmapootra on the east, and to that of the Indus on the west side of the country. South of these valleys lies the Plateau of Deccan, forming the greater part of the peninsula.

In latitude, the country corresponds with that part of America extending from New York City to the mouth of the Orinoco River. The climate is tropical, but the high altitude of the northern provinces gives them a much lower mean annual temperature than the other portions of the country. The rainfall is abundant, but very unevenly distributed. Some districts among the Himalayas have the heaviest rainfall in the world, and in occasional localities more rain falls in a day than in the best watered portions of the United States in a year. On account of the monsoons, the country is subject to a wet and a dry season, and in many sections irrigation is necessary to the successful growing of crops.

Agriculture India is pre-eminently an agricultural country, and more than two-thirds of the inhabitants are engaged in tilling the soil. The land is divided into small holdings, and the most primitive methods are in vogue, consequently the people receive poor returns for the labor expended. Rice, wheat, sugar cane, millet and maize are the principal food products. Jute, cotton, opium, tea and oil-seeds are grown for export. The tea is of excellent quality, and has now nearly dis-



THE WATER FRONT, BOMBAY

placed that of China and Japan in English markets. Silk is grown to some extent, and its culture is rapidly increasing. The coffee crop is also one of prime importance.

Manufactures Nearly all of the manufactures are in the nature of hand crafts. The Hindoos are remarkably skilful in the weaving of fine cotton fabrics, rugs, carpets and shawls, and in the carving of wood and ivory. The products of their handiwork are sought by the wealthy of all lands, and some articles, like the Cashmere shawls, command fabulous

prices. Recently the English factory system has been introduced, and now constitutes an important feature of the cotton industry on the west coast, and of the jute manufacture in and around Calcutta.

Transportation The Ganges is navigable for about a thousand miles, the Brahmapootra is the important waterway for small vessels, and the Irrawaddy is navigable for seven hundred miles. There are upwards of 25,000 miles of



STATION OF THE GREAT BENGAL RAILWAY, BENGAL

railway connecting all the important towns of the interior with each other and with the nearest seaports. These facilities enable the provinces in the interior to dispose of their products at the coast at a reasonable profit. Mail and telegraph facilities are also adequate to the needs of the country. All these conditions are largely due to the administration of the British Government, which has taken great interest in the development of public works.

Cities Calcutta, the capital, near the mouth of the Ganges, with over 1,000,000 inhabitants, is the largest city and the leading commercial and financial center. Bombay, on the west coast, is the leading port for commerce passing through the Suez Canal. Madras, on the eastern coast, has an important trade in cotton and hides. Mandalay and Rangoon are the most important commercial centers of Burma.

Commerce The foreign commerce of India amounts to about \$600,000,000 a year, which, considering its population, is small. This condition is largely due to the abject poverty of a large number of the people. The exports are cotton, wheat, rice, opium, timber and manufactured goods, consisting of textiles, rugs, carpets, shawls and carved wood and ivory. About seventy per cent of the trade is with Great Britain. China and Germany have the next largest shares. India imports kerosene from this country, and furnishes us with indigo, some textiles and opium.

THE STRAITS SETTLEMENTS These comprise several British colonies on and around the Straits of Malacca. The most important are Singapore, Penang and Malacca. The cities in the Straits have large transport trade, that of Singapore amounting to about \$400,000,000 a year. The largest tin mines in the world are near this port, and most of their product is exported to the United States. Other important exports are rubber, gutta percha, spices, tapioca and rattan. The imports are cotton cloth, rice and opium.

QUESTIONS.

In what lines of manufacture are the Hindoos especially skilful? To what countries are most of their manufactured products sent?

How do the buildings in the cities of India compare with those in the large cities of Europe and the United States?

What commercial and industrial benefits has Great Britain conferred upon India?

CHAPTER XIV.

THE CHINESE EMPIRE.

The Chinese Empire comprises China proper and the provinces of Manchuria, Mongolia, Eastern Turkestan and Thibet. Its area is 4,000,000 square miles, or one and one-third times that of the United States, and its population is about 400,000,000. China proper has about one-half of the area of the United States, and a population of about 245,220,000, being more densely populated than any other country in the world. Texas, if all of the inhabitants of the United States were crowded within her boundaries, would not contain as many people to the square mile. In latitude, surface and climate, China closely resembles the United States, but the influence of the monsoons makes it possible to raise crops suited to both the temperate and tropical regions. The out-lying provinces and mountainous regions are sparsely settled.

Agriculture Agriculture is the great industry of China and most of the inhabitants are engaged in it. Every foot of tillable soil is in a high state of cultivation. The land is divided into small tracts, of a few acres each, and the country has the appearance of a vast garden. All work is performed by hand labor and the most primitive methods and implements are employed, yet abundant crops are raised. In many localities irrigation is practised, the water being raised by means of wheels turned by hand or by animal power. The first wheel raises the water to a tank from which it is lifted to the second by another wheel; and so on until the highest level is reached. From here the water is distributed down the slope. Rice is grown on the lowlands of the coast, and wheat, peas and millet wherever they can be cultivated.

Rice is the most important food crop, and China contributes one-half of the world's supply. Silk is also extensively raised and cotton is quite generally raised in the southern part of the Empire along the low coast of the Yangtse. There are no large fields as in the United States, but each garden contains a few plants, and these, in the aggregate, constitute a considerable supply, all of which is consumed in the country.



PACKING BRICK TEA

Mineral Resources The mineral resources are extensive and valuable, but they have not been developed. Bituminous and anthracite coal of excellent quality are found in all the provinces. The coal fields of the Empire are larger than those of Europe combined, and some authorities think they are the most extensive in the world. These great deposits of coal assure the development of extensive manufacturing industries when conditions for such enterprises are ripe. The country also contains large deposits of iron ore, some of which is near the coal. Foreign

capital is seeking to develop these resources, and in a few places has made a beginning. The Germans have a mining concession in Shantung Peninsula, and a London company has obtained the privilege of mining the coal in Shansi. Copper, tin, lead and silver are also found, and are mined to some extent, and the abundance of porcelain clay of the finest quality has made China one of the leading countries in the manufacture of porcelain ware.

Manufactures Most of the manufactures are home industries, and are carried on exclusively by hand labor. The silk and cotton fabrics are nearly all made in this way, but recently a few factories, under foreign management, have been established. These are for reeling silk and spinning cotton. China silks are noted for their fine texture and delicate finish. Porcelain, or chinaware, is also an important manufacture, and in many homes rhea, the fiber of Chinese grass, is woven into light fabrics for summer wear.

Since the importation of firearms was prohibited by the Allied Powers in 1898, a number of manufactories have been established for the purpose of supplying these to the army. All of these factories are government concessions, and are under the supervision of European mechanics.

Transportation The large rivers constitute the important waterways into the interior. The Yangtse is navigable for over a thousand miles, the Hoangho is obstructed by bars, but is navigable for small craft, and the Sikiang on the south furnishes the outlet for the country tributary to Canton and Hongkong. Canals are numerous, but when compared with those of Europe or the United States are poor. The Grand Canal extends from Hangchow to Tientsin, a distance of 700 miles, and is still in a usable condition throughout most of its length, though it was constructed more than a thousand years ago. Roads are so poor that transportation through the interior is well nigh impos-

sible, and there are less than 500 miles of railway in the entire country. The most important line—a branch of the Trans-Siberia Railway—extends to Port Arthur. The innovations consequent upon the introduction of railways make their construction a slow process.

Cities Pekin, the capital, is significant only as a political center. Since the Boxer outbreak in 1898, the representatives of foreign governments have been granted special privileges for protecting the quarter in which they reside, and have built a city,



CUSTOM HOUSE, TIENTSIN

resembling in structure and plan, those found in Europe and America. Tientsin is the seaport of Pekin, and has a large trade. Shanghai is the most important center of trade with the United States and Japan, and Canton, the largest city of the Empire, has in connection with Hongkong, a large trade with Great Britain. The inland cities are of but little commercial importance.

Commerce The trade of the inland provinces is small. The region is sparsely settled, the inhabitants are poor, and the difficulty of transportation prevents extensive exportation or importation of merchandise. Skins, wool and musk are ob-

tained from Thibet. Mongolia is good grazing region, and supplies the camels required in caravan trade with Russia. Manchuria is a good grazing and farming district, and exports millet and animal products to China proper.

The great bulk of foreign commerce is carried on by China through open, or treaty, ports, of which Tientsin, Shanghai and Canton are the most important. The exports are tea, raw silk, porcelain, silk goods and such hand work as lacquer ware and carved wood and ivory, in which the Chinese are remarkably skilful. The leading imports are cotton goods, opium, rice, wheat flour, kerosene, silk, metals and machinery. Nearly one-fifth of the tea goes to the United States and about one-eleventh goes to Great Britain. Nearly half of the foreign trade is through Hongkong, and the largest share is with Great Britain. Most all of this is in the hands of European agents residing in Hongkong or Canton.

A large carrying trade is maintained with Russia, and, previous to the construction of the Trans-Siberian Railway, caravans made overland trips as far as Morocco. The principal article of this trade is tea which is pressed into bricks for convenience in transportation, and also to meet the tastes of the Russians, who have been accustomed to obtaining it in this form for many years.

The trade with the United States is steadily increasing. China imports from us kerosene, wheat flour, machinery and hardware, and exports to us tea, silk and wares peculiar to their manufacture. The American trade nearly all goes through the Pacific ports, Seattle and San Francisco, and lines of steamers are maintained between these cities and the Chinese ports.

The People The Chinese belong to the yellow race. They are conservative, industrious and frugal. They work long hours and for low wages, and while some acquire means and a few become wealthy, the great mass of the people are in abject

poverty. Aside from the inherited right to the throne, any office in the Empire is open to the humblest citizen, if by ability in the execution of public trusts he can show himself worthy of it. Promotion in the Government service is by examination, and only the ablest scholars succeed in securing positions.

The Chinese are the representatives of the oldest existing civilization. When the nations of the West were in a state of barbarism, these people were probably as far advanced as they are today, and for more than 2000 years they were considered the only civilized people of the Far East. They afford the only illustration of people who, for such a length of time, have neither advanced or gone backward. This remarkable characteristic is largely due to the element of ancestor worship in their religious belief. They adhere closely to the institutions and customs of their forefathers, and are not willing to introduce changes which will do away with, or modify, this ancient usage. Consequently they make no progress in civilization.

HONGKONG This is a small island at the mouth of the Siking near Canton, and has an area of about thirty-nine square miles. It is a British colony and is the most important commercial port of Asia. It is an important port of call, and has an extensive transient trade, as it is frequented by the ships of all nations. The commerce is in the hands of Englishmen, and Chinese who have become British subjects.

QUESTIONS.

Compare the Chinese Empire with the United States in area, climate, products and population.

Considering the Chinese to be the oldest existing civilized nation, account for the backward state of the country, and the lack of progress.

How do means of transportation in China compare with those in other civilized countries?

What is the present prospect for commerce between the United States and China? What reasons have you for your opinion?

CHAPTER XV.

JAPAN.

The island empire of Japan extends along the coast, from the twenty-second to the fifty-first parallel of north latitude. The greater part of the empire comprises the islands of Formosa, Kiu-shiu, Hondo, Shikoku and Yezo. Formosa was obtained from China in the War of 1894 and 1895, and is several degrees south of Kiushiu. Hondo is the largest and exceeds all the other islands in area. In all there are 487 islands worthy of administrative notice. The area of the empire is about 161,157 square miles, or a little more than that of California, and the population is about 46,000,000, or more than half that of the United States.

The surface is mountainous, and Hondo is characterized by a main mountain range, extending the length of the island, and having upon either side lower parallel ranges. The rainfall is abundant, and the continual weathering of the rocks has covered the valleys with a deep and fertile soil. The climate in the extreme south is sub-tropical, and temperate in the other portions of the empire.

Agriculture The large population makes it necessary to bring the soil to the highest state of cultivation, and also to occupy every square foot of tillable land, which, owing to the mountains, does not exceed one-sixth of the area of the empire. Fish refuse is used for fertilizer and abundant crops are raised. Rice is the leading food crop, and is grown along the coast and in the lowlands of the west. The other important food crops in order are wheat, rye, barley and beans. Tea is raised in the southern islands, and the lacquer tree, from the sap of which

the lacquer varnish is obtained, is extensively cultivated. The mulberry tree is cultivated throughout Hondo, except in the extreme northern part, and silk-raising is one of the most important industries. Formosa is the leading camphor-producing country and more than half of the world's supply comes from this island.



WOMEN SPINNING AND WEAVING SILK

Mineral Resources Coal, iron and copper are the most important minerals. The out-put of coal and iron is steadily increasing and coal markets have been established in China, the Straits Settlements and the Philippines. The most important mines are in Yezo and Kiushiu. An excellent quality of copper is also found, and its mining has developed into quite an important industry.

Manufactures Textiles constitute the leading manufactures, and give employment to over 1,000,000 operatives. Seventy thousand of these are engaged in the cotton mills, of which there are now seventy-four in operation. Large quantities of silk are also made. The raw material is exported from India, and only coarser goods are made. Much of both the cotton and the silk, however, is woven in hand looms in the homes. The



THE HARBOR, NAGASAKI

best straw-matting in the world is made both for home consumption and for export. Woolens are also manufactured to some extent.

The Japanese are skilful in the manufacture of art goods, and in making wood, metal, pottery and small wares, but these are all home industries and are of minor importance in the commercial development of the country. Since the admission of foreigners to the country, the Japanese have made remarkable advancement in

the adaptation of the methods and machinery of western nations. Their manufacturing industries are rapidly developing, and they now constitute an important factor in the commercial and industrial life of the Empire.

Transportation The carriage roads are in rather poor condition for the transportation of merchandise, though the light jinrikishas, which are two-wheeled carts drawn by men, traverse them without difficulty. Most of the cities and productive valleys are within easy reach of the sea, where good harbors are numerous. There are about 4000 miles of railway in the Empire, connecting the most important towns. Telegraph, telephone and mail services are also good.

Cities Tokio, the capital and largest city, has over a million inhabitants, and is an important commercial port. Yokohama and Kobe are centers of the largest foreign trade. Nagasaki has a fine harbor and is an important coal market, and Hakodate on Yezo is the commercial center for the north, and has a flourishing trade in coal and fish. These and a number of small cities are

treaty ports and are open to the vessels of all nations.

Commerce Japan has an important trade with foreign nations and it is constantly increasing. The leading imports are raw cotton, iron and steel, wool, flax, hemp, jute, jute textiles, sugar, petroleum, machinery and firearms. The leading exports are silk, raw and manufactured, cotton yarn, tea, coal



RIVER FRONT, TOKIO

and copper. Rice, porcelain, straw goods, matting and small wares are also exported. Great Britain furnishes the largest part of the imports, with the United States standing second, British India third, Germany fourth and China fifth. The United States takes most of the exports, of which tea constitutes the largest share. Most of the merchandise enters the country by San Fran-



A VIEW IN YOKOHAMA

cisco and Seattle. The yearly foreign trade amounts to about \$490,000,000, nearly one-fourth of which is with the United States. The yearly exports to this country amount to about \$44,000,000, and the imports from it \$21,000,000.

The People The Japanese, as do the Chinese, belong to the Mongolian or yellow race, but in nearly all respects they are the opposite of the Chinese. They are small of stature, wide awake and aggressive. They are quick to see advantages

derived from the adoption of the customs and methods of western nations, and in the last few decades have made wonderful progress in government, education, industries and commerce. For this reason they have been styled "the Yankees of the East," and Japan is also called the "Asiatic Great Britain." There is a constantly increasing demand for American products in their country, and this demand the American merchants and manufacturers are striving to supply.

KOREA Previous to the Chinese-Japanese War in 1895, Korea was a dependency of China, but at that time it became independent. It is often referred to as "the Hermit Kingdom," and from an industrial and commercial point of view it is of little importance. Its area is about equal to that of Minnesota, and its population is about 10,000,000. It is an important strategic point and the attempt of Russia to secure a foothold in the country, together with her refusal to evacuate Manchuria, according to agreement, led to the Russo-Japanese War in 1904-05. The Kingdom is without any important cities. Seoul is the capital, and Mus-hampo and Fusan are the most important seaports.

QUESTIONS.

Why is intensive farming so generally practised in Japan?

How do the mineral resources of Japan compare with those of China in extent and value? In regard to their development?

Account for the rapid progress that Japan has made since 1850.

In what respects do the Japanese differ from the Chinese?

Why does the United States have so large a proportion of Japan's foreign trade?

CHAPTER XVI.

OTHER ASIATIC COUNTRIES.

SIAM AND THE FRENCH POSSESSIONS

These occupy part of the Indo-China Peninsula. Siam is an independent kingdom, and the French colonies include Tongking, Annam, Cambodia and Lower Cochin-China. The most important industry of the whole region is raising rice. In the deltas of Mekong, more than half a million tons are grown each year. This is exported to Hongkong and Singapore. Pepper, other spices, tropical fruits and teak timber are the other important exports. The imports are manufactures, especially textiles and machinery.

AFGHANISTAN AND BALUCHISTAN

These are two quasi-independent states, west of British India, and lying between Turkestan and the sea. Afghanistan contains some of the richest mineral deposits on the continent. Both countries are separated from India by mountain ranges which can be traversed only through passes. The climate is cool-temperate, and the leading products are cereals and peas and beans. Most of the inhabitants are wandering tribes, and there are no settled industries. These countries are important on account of their position, and have for years formed a "bone of contention" between Russia and Great Britain. The mountains are crossed through two important passes, the Khaibar, connecting Peshawur in India with Jalalabad and Kabul, and now traversed by a railroad. The Bolan Pass also contains a branch of the same line of railway extending as far as Kandahar. Considerable trade passes over these routes. Both countries are under the protectorate of Great Britain.

PERSIA Persia occupies the greater part of the Plateau of Iran.

About one-third of the country is desert, but the valleys and lowlands receive enough moisture from the rains and the mountain streams to be productive and abundant crops of food-stuffs are raised. The country is also quite rich in minerals, and in past ages mines of tin, copper, lead and silver were worked with profit. Tobacco, small fruits, opium, wool and silk are the most important products for export. The Persians are noted for their skill in weaving rugs and carpets, which are sold in American and European markets at fabulous prices. There are also valuable pearl fisheries in the Persian Gulf. Generally the industries are unimportant as the country is in a backward condition. Tabriz is the center of the manufacture of rugs and shawls. Bushire and Bender-Abbas are the seaports and Trabizond is the center of Russian trade.

THE EAST INDIES

The East Indies include nearly all the islands of the Malay Peninsula. Most of them are Dutch Colonies and they have an excellent administration. The most important islands are Java, Borneo, Sumatra and New Guinea. North Borneo belongs to the British Empire, West New Guinea is Dutch and the eastern half is divided between the British and the Germans. All of these islands produce tropical fruits and spices. Java and Sumatra lead in the production of coffee, sugar-cane, tobacco, rice, indigo and pepper. The coffee of this region is celebrated in both Europe and America. The trade of the islands is in the hands of middlemen, most of whom are Chinese.

QUESTIONS.

Of what commercial advantage are her Asiatic colonies to France?

Of what value are the Dutch East Indies to Netherlands?

Why is Great Britain especially interested in Afghanistan?

With what countries does Persia have the most extensive trade?

CHAPTER XVII.

AUSTRALIA.

Surface Australia extends from the eleventh to the thirtieth parallel of south latitude and from the one hundred thirteenth to the one hundred fifty-fourth degree of west longitude. Its greatest length from east to west is 2360 miles, and from north to south 1600 miles. Its area is a little less than that of the United States, exclusive of Alaska, and the population is a little over 3,000,000.

Australia is the highest portion of a partially submerged plateau, which, at an average depth of six hundred feet, extends around the continent for a considerable distance. The mountains are near the coast, and from them the land slopes gradually to the great interior plain that constitutes the larger part of the continent. In the center of this plain there are some low ranges of hills, but with this exception it is nearly level, and in the south it extends to the coast. The highest mountains are in the eastern part of the continent. In general appearance these mountains resemble the Appalachians, being the worn down remains of an ancient system. Someone has compared the continent to a huge plate, high around the edges and gradually sloping to the great flat interior. The comparison is a happy one.

The streams flowing eastward into the Pacific are short and rapid, but those flowing south and west are longer and flow more quietly. Most of these lose themselves in the salt lakes and marshes of the interior. The Murray-Darling system, flowing into the sea on the south, is navigable for some distance. The rivers on the west are short and small.

Climate The large body of water surrounding the continent exerts an equalizing influence over the temperature, yet the summers are extremely hot, owing to the vast expanse of land from east to west upon which the sun's rays fall vertically several hours in the day. During the winter the interior becomes quite cold, and the land winds are several degrees below the surrounding atmosphere over the sea. Frost seldom occurs between the coast and the mountains.

Rainfall The continent lies within the belt of the southeast trades, and the eastern coast secures an abundance of rain. On the inner slope of these mountains there is a narrow strip of country having an annual rainfall of about twenty inches. From this semi-arid belt the rain gradually diminishes until the great interior desert is reached. This great region is from five to seven degrees wide and occupies about one-half the continent. Its greatest elongation is from east to west, and it extends northward from the Great Australian Bight to the twentieth parallel. The southern coast east of the Bight and a small area in the extreme southwest are well watered, and the most northerly section east of the Gulf of Carpentaria has a heavy rainfall. The rainfall is very unevenly distributed, and at irregular intervals, sometimes extending over a period of several years—large areas suffer from disastrous droughts.

Resources Australia is so far removed from the other continents that its animal and vegetable life are unlike those of any other part of the world. Many of the plants bear close resemblance to those of past geologic ages, such as those of the coal period. Where the rainfall is abundant heavy forests are found. Some of the gum trees approach the Big Trees of California in size, growing to a height of nearly 400 feet. Mingled with these are smaller trees, tree ferns, and club mosses of gigantic size. Most of the foliage has a leathery structure; the

leaves of some plants turn their edges instead of their surface towards the sun and earth. In the semi-arid and arid regions varieties of rapid growing grasses are found.

Agriculture The grasses form excellent fodder for sheep, and the climate of the semi-arid regions is well suited to the requirements of these animals, therefore, we find sheep-raising the most important agricultural industry in all the provinces. Most of the flocks are merinos, and Australia has become the largest wool-producing country of the world. The wool is of excellent quality and is exported to all the leading countries engaged in the manufacture of woollen goods. The annual out-put exceeds 500,000,000 pounds, or nearly one-third the world's supply.

Hides, tallow and fresh meat are also important animal products for export. The meat is frozen and transported in refrigerator ships, reaching England in an excellent state of preservation.

Grapes for raisins are raised in Victoria and New South Wales. Sugar cane is raised in Queensland and cereals for home use are grown in all the provinces. The forests supply a good quality of hard-wood lumber for export, and some gums and important drugs.

Minerals Gold is the most important mineral and, next to wool, constitutes the most valuable export. Before the discovery of the mineral in South Africa, the Australian gold mines were the richest known. The most important mines are in Victoria; copper, silver and iron ore are also found, but the iron has not been worked to any extent. Coal is found in New South Wales and New Zealand and is exported to quite an extent. Australian coal was formerly in general use in the southern part of California, but the discovery of petroleum in that locality has largely done away with the necessity for coal.

Cities Melbourne, the capital and chief city of Victoria, is the largest city of Australia, and has about 500,000 inhabitants. It is on an excellent land-locked harbor and carries on an

extensive foreign trade. Adelaide, in South Australia, Sidney, in New South Wales, and Brisbane, in Queensland, are the other important cities in the eastern portion of the continent. Hobart is the leading city of Tasmania, and Perth, is the most important town on the western coast.

All the eastern provinces and South Australia are well supplied with railways. They connect all the important towns on the coast and a number of lines extend inland from 300 to 500 miles. Telegraph lines are also found in these provinces, and a line extends over the continent from Adelaide to Palmerston on the northern coast.

Commerce Australia is one of the most valuable colonies of Great Britain and the leading trade is with that country, which has about three-fourths of the foreign commerce. The United States is second in importance. The exports are gold, wool and mutton. The imports are manufactured goods, hardware and machinery. The entire foreign trade amounts to about \$550,000,000 a year, of which a little over \$280,000,000 are exports. The annual trade with the United States is about \$30,000,000. Our exports to Australia consist of tobacco, lumber, leather, railway-supplies and coal-oil. Our principal import from there is wool.

QUESTIONS.

What portions of Australia are suited to agricultural purposes? What portions have valuable mineral deposits?

What has made Australia the leading wool-producing country? In what other industries does she excel?

By what people was Australia settled? How do they compare in habits and customs with the people of the United States?

What American ports are engaged in trade with Australia? Is this trade increasing?

What effect will the completion of the Panama Canal have upon our trade with Australia?

CHAPTER XVIII.

AFRICA.

Surface Africa extends from the thirty-seventh parallel of north latitude to the thirty-second parallel of south latitude, and is about one and one-third times as large as North America. The continent is broadest in the northern part, and it has a remarkably even coastline with few good harbors. The mountains are different from those of any other continent. In the interior is a vast plateau, with a rim of low mountains around the edge, near the coast. The Atlas Range on the north reaches an altitude of 14,000 feet, and the loftiest peaks are in the eastern and central parts of the continent, among the Ruwenzori and the Mountains of the Moon. The rivers all rise in the interior and have falls or rapids wherever they pass over the Fall line to the low land of the coast regions. For this reason they are not navigable for ocean going vessels, except for a few miles from the sea. This rim of highlands around the continent prevented the interior from being explored for many years after America was discovered and settled.

Climate The extreme northern and southern portions of the continent have a warm temperate or semi-tropical climate, but most of this vast area lies within the tropics. The highlands in the interior of the equatorial regions give that part of the continent an abundance of rain, and the forests and other vegetation rival in luxuriance that of the Amazon valley. With a few exceptions, the northern and southern portions of the continent also have sufficient rainfall for agricultural purposes; but, between these sections, and the equatorial regions on the other side, are the great arid regions forming the Sahara on the north and the Kalahari Desert on the south.

Political Divisions A political map of Africa shows that nearly the entire continent is divided among European powers. Morocco, Abyssinia and Liberia are the only independent states, and the Kongo Free State is a semi-dependency of Belgium. Of all the territory claimed by the different nations, France has the largest area, and some of the territory is valuable, but the British possessions are by far the most important, both on account of their resources and their strategic locations. German East Africa is also a fertile country and has valuable resources, but at present the claims of the other nations are of no special advantage to the holders.

For industrial and commercial purposes Africa can be considered in three divisions: Northern Africa, which extends from the Mediterranean to the Soudan; Central Africa, from the Soudan to the Zambesi River, and Southern Africa, from the Zambesi to the Cape of Good Hope.

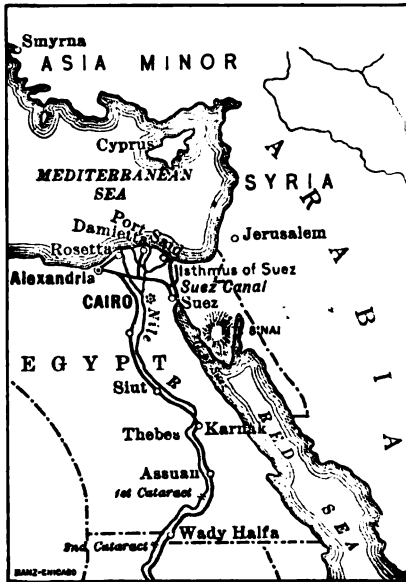
NORTHERN AFRICA.

The land between the Mediterranean coast and the Atlas Mountains is fertile, and sufficiently well watered to admit of raising cereals, semi-tropical and tropical fruits, cotton, coffee, vegetables, cacao and spices. All the surplus of these crops is shipped to Southern Europe, where it finds ready sale. Morocco is poorly governed and all industries are in a backward condition, but Algeria and Tunis, which are French colonies, have, under the protecting care of home government, become fairly prosperous. Algeria exports large quantities of cork, and much of the so-called French wine is produced here. Besides their own exports, these countries handle a lucrative caravan trade from the region south of the Sahara. Caravans bring ostrich plumes, gums, ivory and other tropical products, which are exchanged for cotton goods and other manufactures.

The trade centers are Algiers, which is the financial center,

Oran, the most important seaport, and Tripoli, the center of the caravan trade, which receives about 10,000 camel loads of merchandise annually. Trade is principally in the hands of Arabs, who make regular trips between Tripoli and Timbuctoo and Lake Chad.

EGYPT Egypt is the most important country in Northern Africa. The fertile portions are confined to a few



THE SUEZ CANAL

miles each side of the Nile, from which water for irrigation is supplied. The land is so well tilled that abundant crops are grown. Wheat, millet and cotton are the most important crops, and cotton is the leading article of export. The long fiber of Egyptian cotton rivals in quality the famous "sea island" cotton of the United States, and for that reason large quantities of it are sent to this country each year for making thread. Rice is grown in large quantities, but not enough for the needs of the people. Wheat and beans are

exported to Europe. Sugar-cane is raised, and considerable raw silk is produced.

The cultivable area has recently been largely extended by the construction of two great dams across the Nile, one at Assuan, and the other at Assuit. The former is one of the finest pieces of engineering in the world, and will store sufficient water to irrigate 2500 square miles of land.

There are no mining or manufacturing industries of note, and

cigarettes made from Turkish tobacco are the most important manufactured export. The leading trade is with Great Britain. The exports are agricultural products, and the imports manufactures, coal and lumber. Cairo is the largest city, and is at the head of the Nile Delta. Alexandria is the seaport through which the exports and imports pass. Port Said and Suez are at the opposite ends



PORT SAID, THE NORTHERN ENTRANCE TO THE SUEZ CANAL

of the Suez Canal. Khartoum is the most important commercial center in the interior. A railway 1200 miles in length extends from Cairo to Khartoum, and short branches have been constructed at frequent intervals to act as feeders of this line. About 4000 ships pass through the Suez Canal each year, and seven out of every ten of these are British.

Egypt is tributary to Turkey, but politically it is a colony of

Great Britain, which manages all of its financial and commercial affairs and supervises its foreign relations, as well as the Suez Canal.

SOUDAN As the mountainous regions in the north merge into the desert, so does the desert merge into the grassy plains of the Soudan. Commercially, this region is of but little



A CARGO OF EARTHEN JARS, EGYPT

importance. With the exception of Liberia on the western coast, the territory is divided between Great Britain, France and Germany, and in time portions of it will undoubtedly be developed, but the climate along the western coast is so unhealthful that white men can not live there. Most of the trade is from the interior and finds an outlet through the northern French colonies by means of caravans.

CENTRAL AFRICA.

This includes a region considerably larger than the United States. It has a tropical climate, abundant rainfall and, over much of its area, a luxuriant tropical vegetation. It has over 1,000,000 square miles of dense forests, rivalling in the extent and value of their products those of the Amazon, and it is destined to become one of the great sources of the world's timber supply.



SCENE ON AN OSTRICH FARM

As in the Soudan, the lowlands along the coast are unhealthful to white men, but in the interior the climate is more favorable and the development of the Kongo region shows that Europeans can live in the country with perfect safety. The territory is divided between the Kongo Free State, Great Britain, Germany, France and Portugal.

KONGO FREE STATE This occupies a large portion of the basin of the Kongo River and includes nearly 1,000,000 square miles. The Kongo and its tributaries furnish over 6000 miles of navigable waters, which enable the

most important sections of the country to be reached by steamer. The State has at present a population of about 30,000,000 most of whom are still in an uncivilized state. The most important products are rubber, gums, ivory and fibers from various plants. Since its organization in 1885, this state has been under the administration of the International African Association, of which the King of Belgium is the head. Practically he has been both the legislator and executive officer for the country. The local government is administered by the governor-general residing at Boma. Regular lines of steamers ply on the Kongo and its most important tributaries, and a railway reaches from the coast to Leopoldville above the rapids, a distance of about 250 miles.

The resources of this region are boundless. Besides vegetable products, there are large deposits of iron ore and other minerals, which have not yet been in the least developed, except as natives use the iron for tools and weapons. The people are amenable to civilization and in the course of time will undoubtedly be developed into a strong and productive nation.

FRENCH KONGO French Kongo extends to the northeast from the Atlantic Coast and is bounded on the south by the Kongo River, and on the north by the German colony of Kameroon. Its climate and products are in every way similar to those of the Kongo Free State.

GERMAN EAST AFRICA This is a large productive area lying to the east of the Kongo Free State. It does not have as abundant rainfall, and would seem in every way to be better adapted to general agriculture, since the land is free from dense forests and more easily cultivated. As yet there has been but little done to develop this region.

BRITISH EAST AFRICA To the north of German East Africa is British East Africa, an equally fertile and valuable region. A railroad has been completed through

this territory from Monbasa on the coast to Port Florence on Victoria Nyanza, a distance of about 600 miles. This railway connects the British colony of Uganda with the coast.

**PORTUGUESE
POSSESSIONS**

The Portuguese possessions lie south of the Kongo Free State and German East Africa. They are the remnants of territory claimed under explorations made a little before Columbus discovered America. The country on the west coast has never yet been developed in the least, except in the vicinity of a few towns which have fairly good harbors, but the east coast has a number of good harbors which furnish the outlet for the trade from the interior, and this section has been opened to civilization more fully than that on the west.

SOUTH AFRICA.

This region includes all of the country from the Zambezi River to the South, and the most valuable part of it belongs to Great Britain. On the west is German Southwest Africa, at present an unimportant colony, and on the east is the southern portion of Portuguese East Africa, or the old Mozambique country. The British possessions extend from the Kongo State on the north southward to the Cape, and include Rhodesia, Natal, Transvaal Colony, Orange River Colony, Cape Colony, and a few other small political divisions. The interior is too dry for successful agriculture, but it constitutes an excellent grazing country, and sustains thousands of cattle, sheep and goats. South of the Orange River Colony there is more rainfall, and nearly all crops common to a temperate climate are raised. Fruits are grown profusely, and as they ripen during our winter months the grapes find a ready market in London and other English cities, to which they are sent in refrigerator ships. Wool, mohair, hides and leather are other agricultural exports.

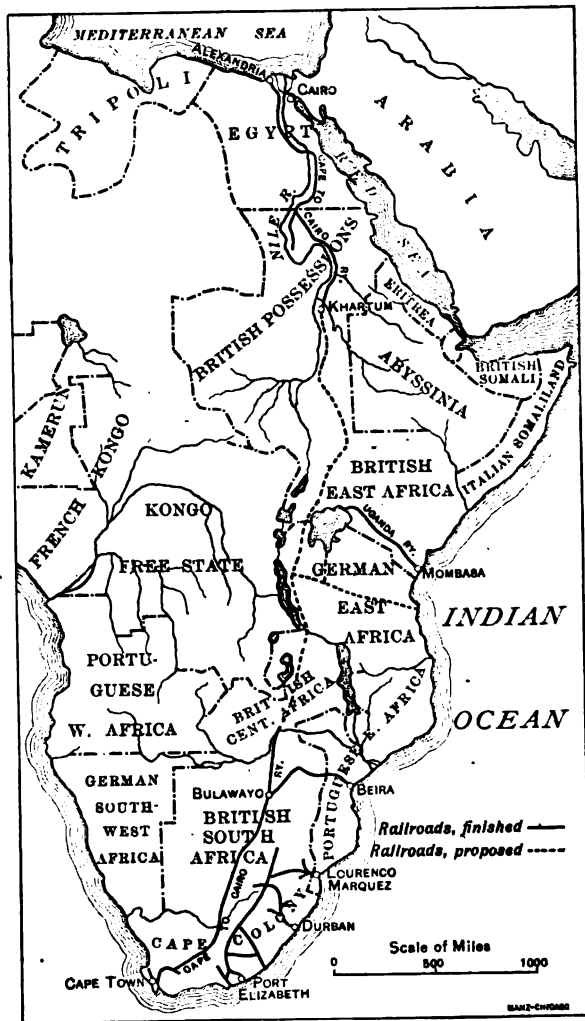
Minerals This is one of the richest mineral regions in the world. The diamond mines in Kimberly supply ninety-eight per cent of all the diamonds used, and the gold mines of the Transvaal, near Johannesburg, are the richest mines in the



AN OPEN DIAMOND MINE, KIMBERLY

world, and their development is only just begun. Coal in abundance is also found in this region, but it has not yet been mined to any extent.

Cities Cape Town, at the southern extremity of the continent, before the construction of the Suez Canal, was one of



CAPE-TO-CAIRO RAILWAY

the most important ports of call in the world and now receives several thousand vessels every year. Johannesburg, next to Cairo, is the largest city of the continent. It has been built since the opening of the great mines in the Transvaal and is in every way a modern city of some over 100,000 inhabitants. Pretoria was the former capital of the Dutch Republic. Durban, Lourenco Marquez and Beira are important seaports on the eastern coast and each has railway connection with the interior. Port Elizabeth, on the south coast, is the most important seaport.

Zanzibar, on the island of the same name, opposite German East Africa, occupies a position in reference to this region somewhat similar to that of Hongkong in reference to Asia. It is a British colony, but its government is administered by a sultan. The great island of Madagascar belongs to the French.

Comparatively, the commerce of Africa is yet small.

Commerce It is only within the last few years that by reason of its wonderful resources and possibilities the attention of the civilized nations has been turned to this continent. As these possibilities are becoming better known, the commerce is increasing, and the development in the near future will undoubtedly be much more rapid than it has been in any equal period in the past. The great trunk line, known as the Cape-to-Cairo Railroad, has been projected, and about 1800 miles of the southern portion and 1200 miles of the northern portion of it have already been constructed. Both in the South and in the North branches extend from this line to the coast towns, or into fertile agricultural or mineral regions. An immense steel bridge has been completed across the gorge below Victoria Falls on the Zambezi. This bridge is one of the most remarkable feats of engineering in the world. It conducts one branch of this railway into a country rich in both agricultural and mineral resources.

The Cape-to-Cairo telegraph is completed as far north as Lake

Tanganyika, and south beyond Khartum. All important cities are also connected by telegraphic lines. Most of the trade is with the European countries, though the United States has exported to South Africa considerable quantities of railway supplies, hardware and electrical machinery. Africa has a vast population, which when once fully acquainted with the customs and usages of civilization, will create a demand for manufactures that can not do otherwise than greatly stimulate the industries of all countries having commercial relations with the continent.

QUESTIONS.

Which is the larger, Africa or North America?

How do the climatic conditions in Africa compare with those in South America?

Why was Africa so long neglected by the civilized nations? What nations now have a controlling influence in the affairs of the continent?

With what European countries do the States of Northern Africa engage in trade? What commodities are exchanged?

How do the products of the Kongo Free State compare with those of the Amazon Basin?

In what portion of Africa do we find climatic and agricultural conditions resembling those on the Great Plains in the United States?

What section of the continent is well supplied with railroads? What trunk line is now being constructed? How far is it completed?

To what extent is the United States interested in commerce with African countries?

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